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PROCEEDINGS  
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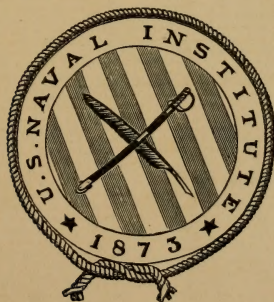
VOLUME XI.

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MARINE INTERNATIONAL LAW

COMPILED FROM VARIOUS SOURCES BY

COMMANDER HENRY GLASS, U. S. N.



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TO

E. M. J.

TO WHOSE ENCOURAGEMENT AND INTEREST IN THIS WORK  
ITS COMPLETION IS DUE.





## PREFACE.

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The compiler of this volume of Notes on Marine International Law lays no claim whatever to originality. It is simply, as shown by the title-page, a compilation from the writings and opinions of certain acknowledged authorities on the subject, and, where it was possible to do so, the language of the authorities cited has been quoted literally.

International Law, as at present recognized, is so largely made up from the decisions of jurists and the opinions of writers and statesmen of international reputation, that any attempt at originality in the treatment of the subject is out of the question; hence no apology is considered necessary for the use that has been made of the work of others, due credit being given in every case.

The object of these Notes is to show, as clearly and concisely as possible, what are recognized principles of International Law relating to maritime affairs, and to do so in a manner that will make them of use to the naval officer on service. The commander of a vessel of war frequently has questions brought to his attention involving the interests and the honor of his flag—cases requiring prompt decision, where he may not have the necessary authorities at hand to assist him, nor the time needed to consult and compare them were they available. It was to meet such cases that this work was undertaken; and, if it does not fully answer its purpose, the compiler trusts that it may at least be the means of attracting to the important subject of which it treats, the attention which it merits from all who are interested in maritime affairs.





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A few quotations, from text-writers not in the possession of the compiler, used by Mr. Lawrence in his notes to Wheaton, have been taken from those notes, giving credit in each case.

The references in the foot-notes are to the editions of the various works as named in the above list.

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# THE PROCEEDINGS

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MARINE INTERNATIONAL LAW.

BY COMMANDER HENRY GLASS, U. S. NAVY.

PART I.

INTERNATIONAL LAW.

ITS OBJECTS, SOURCES AND SANCTIONS.

International Law is the system of rules governing the inter-  
course of nations in peace and war. The naval officer is chiefly  
concerned with that division of the subject which relates to war,  
its causes, objects, and rules of conduct; and it is that division,  
as applied to maritime affairs, which these notes are intended to  
illustrate.

Sec. 1. Definition.

“The law of nations is the science which teaches the rights  
subsisting between nations or States, and the obligations corres-  
pondent to those rights.”\*

Vattel.

“The law of nations modifies the intercourse of independent  
commonwealths in *peace*, and prescribes limits to their hostilities  
in *war*. It prescribes, that in peace, nations should do each  
other as *much good*, and in time of war *as little harm*, as may  
be possible, without injuring their own proper real interests.”†

Chitty.

“International Law, as understood among civilized nations,  
may be defined as consisting of those rules of conduct which  
reason deduces, as consonant to justice, from the nature of the  
society existing among independent nations; with such defini-

Wheaton.

\* Vattel, p. liii.

† Note to Vattel, p. liii.

tions and modifications as may be established by general consent."\*

Woolsey.

"International law, in a wide and abstract sense, would embrace those rules of intercourse between nations which are deduced from their rights and moral claims; or, in other words, it is the expression of the jural and moral relations of States to one another.

"According to this definition, if we could once find out what are the rights and obligations, the moral claims and duties of nations as such, by mere deduction, the principles of this science would be settled. But such an abstract form of the science, commanding general assent, has neither appeared, nor is likely to appear."†

Sec. 2. The divisions of the subject.

Text-writers have, for convenience, made certain divisions of international law, such as *necessary*, *voluntary*, *conventional* and *customary* law, according to the source whence the rules of conduct have been derived.

The necessary law.

"We call that the *Necessary Law of Nations* which consists in the application of the law of nature to *nations*. It is *necessary* because nations are *absolutely* bound to observe it. Several writers term it the *Natural Law of Nations*."‡

The voluntary law.

The voluntary law of nations is based upon treaties and obligations voluntarily entered into by States, and upon the customs adopted by them in their intercourse. Hence the subdivision of the voluntary law into conventional law, or that depending upon the *express* consent of nations, and customary law, or that depending upon their *tacit* consent.§

"Perhaps a division like the following may have something to commend it, which separates the rights and obligations known to this science into, (1) those which are deducible from natural *jus*, which no sovereignty began or can terminate; (2) those deducible from the idea of a State; (3) those which are begun and can be ended by compact, expressed or tacit."||

Sec. 3. The subjects of international law.

"The peculiar subjects of international law are nations and those political societies of men called States."¶

"*Nations*, or sovereign States, are to be considered as so many free persons living together in the state of nature."\*\*

\* Lawrence's Wheaton, p. 26.

† Woolsey, Sec. 3.

‡ Vattel, p. lvii.

§ Vattel, p. lxvi; Wheaton, p. 14.

|| Woolsey, Sec. 27.

¶ Lawrence's Wheaton, p. 31.

\*\* Vattel, p. lv.

"A sovereign State is generally defined to be any nation or people, whatever may be the form of its internal constitution, which governs itself independently of foreign powers.

Sec. 4. Definition of a State.

"This definition, unless taken with great qualifications, cannot be admitted as entirely accurate. Some States are completely sovereign and independent, acknowledging no superior but the Supreme Ruler and Governor of the Universe. The sovereignty of other States is limited and qualified in various degrees."\*

"All sovereign States are equal in the eye of international law, whatever be their relative power."†

Sec. 5. Equality of States.

The independent action of States, and consequently their complete sovereignty, may be limited and modified by treaty obligations. States thus dependent upon other powers for the exercise of certain rights of sovereignty have been termed semi-sovereign States.‡

Sec. 6. Semi-sovereign States.

"Sovereignty is the supreme power by which any State is governed. This supreme power may be exercised either internally or externally.

Sec. 7. The sovereignty of a State.

"Internal sovereignty is that which is inherent in the people of any State, or vested in its rulers, by its municipal constitution or fundamental laws.

"External sovereignty consists in the independence of one political society, in respect to all other political societies. It is by the exercise of this branch of sovereignty that the international relations of one political society are maintained, in peace and in war, with all other political societies. The law by which it is regulated has, therefore, been called external public law, *droit public externe*, but may more properly be termed international law."§

"Sovereignty is acquired by a State, either at the origin of the civil society of which it is composed, or when it separates itself from the community of which it previously formed a part, and on which it was dependent.

Sec. 8. How sovereignty is acquired.

"The internal sovereignty of a State does not, in any degree, depend upon its recognition by other States. A new State, springing into existence, does not require the recognition of other States to confirm its internal sovereignty. The existence

\* Wheaton, p. 58.

† *Ibid.* p. 58.

‡ *Ibid.* pp. 58, 59.

§ Lawrence's Wheaton, pp. 35, 36.

of the State *de facto* is sufficient, in this respect, to establish its sovereignty *de jure*. It is a State because it exists.

"The external sovereignty of any State, on the other hand, may require recognition by other States in order to render it perfect and complete. So long, indeed, as the new State confines its actions to its own citizens, and to the limits of its own territory, it may well dispense with such recognition. But if it desires to enter into that great society of nations, all the members of which recognize rights to which they are mutually entitled, and duties which they may be called upon reciprocally to fulfil, such recognition becomes essentially necessary to the complete participation of the new State in all the advantages of this society. Every other State is at liberty to grant, or refuse, this recognition, subject to the consequences of its own conduct in this respect; and until such recognition becomes universal on the part of the other States, the new State becomes entitled to the exercise of its external sovereignty as to those States only by whom its sovereignty has been recognized."\*

Sec. 9. The identity of a State.

"A State, as to the individual members of which it is composed, is a fluctuating body; but in respect to the society, it is one and the same body, of which the existence is perpetually kept up by a constant succession of new members. This existence continues until it is interrupted by some change affecting the being of the State."†

Sec. 10. The obligations of a State.

The obligations of a State are unchanged by any modification in its form of government. Treaties with other powers still remain in force, and the public debts are held inviolable.

The State is responsible for injuries done the citizens or the government of another State, notwithstanding such injuries were committed during an interruption in its form of government.‡

"As soon as a nation has assumed the obligations of international law, they become a portion of the law of the land, to govern the decisions of courts, the conduct of the rulers and that of the people. A nation is bound to protect this part of law by statute and penalty as much as that part which controls the jural relations or in other ways affects the actions of individuals. Otherwise it is a dead letter; there is a want of

\* Lawrence's Wheaton, pp. 36, 39.

† *Ibid.* p. 39.

‡ Vattel, p. 205; Wheaton, p. 57.

faith towards foreign powers, and there is a danger of quarrel ending in war.”\*

“As being a part of the common law of England, the law of nations is adopted by our own law also; for it is well settled that the common law of England, so far as it may be consistent with the constitution of this country, and remains unaltered by statute, is an essential part of American jurisprudence.”†

Sec. 11. International law adopted by the United States.

Many of the principles of international law have received the express sanction of the Constitution and statutes of the United States, and they are made to control the actions of citizens by the infliction of penalties for any violations of them.‡

In order to ascertain what are the accepted principles of international law, we must consult:

Sec. 12. The sources of international law.

1. The various codes of sea-laws which came into use in the early history of commerce in Europe.

2. Treaties made by civilized nations, both with regard to their political relations and the regulation of commerce. In these notes, where any treaties of the United States, now in force, touch upon any points of interest to the naval officer, they will be quoted.

3. The decisions of the courts of civilized nations involving questions of international rights and duties. In questions relating to blockades and contraband of war, the decisions of the British Court of Admiralty and of the United States Prize Courts may be considered as the highest authority.

4. The opinions of the leading statesmen of civilization as given in discussions of international questions.

5. The opinions of text-writers of acknowledged authority on this subject.

6. The history of wars, negotiations, conventions, and other transactions affecting the intercourse of nations.

In comparing the sources of information above enumerated, great diversity of opinion and practice will be found, and many propositions have been made for an International Congress to settle authoritatively many points of uncertainty in the law of nations, but, as yet, without success. As there could hardly be a court of adequate jurisdiction to enforce penalties for violations of an international code of law, even were such a code established, no attempt to enact one is likely to succeed.

Sec. 13. The uncertainties of international law.

\* Woolsey, Sec. 29. † Kent, Lect. 1. ‡ See “Neutrality,” “Piracy,” &c.



The uncertainty connected with this subject leads a recent writer on international law to remark: "The term 'international law' would seem to imply the existence of a regular code, with no more of uncertainty than belongs to any system of national law. Some experiences would lead almost to the opposite conclusion, that there was no system at all. The fact lies between; all nations recognize and practice certain leading principles; such as the right to blockade, and to make prize of violators thereof; prohibition and confiscation of contraband, &c. But they vary widely in the application—in determining what constitutes blockade, and what is contraband."\*

Sec. 14.  
The sanctions of  
international  
law.

"As nations are independent of each other, and acknowledge no superior, there is, unfortunately, no sovereign power among nations to uphold or enforce the international law; no tribunal to which the oppressed can appeal, as of right, against the oppressor; and, consequently, if either nation refuse to give effect to the established principles of international law, the only redress is by resorting to arms, and enforcing the performance of the national obligation; and this is the principle of just war."†

To the means of preventing injury, or obtaining redress, afforded by war, there must be added at the present day the force of public opinion, and the municipal laws of civilized nations which confirm the principles of international law in many cases and make violations of those principles penal.‡

It was the force of public opinion, ever growing stronger in favor of right and justice in the intercourse of nations, that rendered possible the Treaty of Washington of 1871, between the United States and Great Britain, and the settlement by arbitration at Geneva of many questions in dispute between those powers that had on several occasions almost resulted in war.

In the following pages an endeavor is made to exhibit those leading principles of the science, in regard to which there is such uniformity of practice among civilized nations as places them beyond question, and to show what the present state of international law is, rather than what it has been, or should be.

\* Dahlgren, p. 115. † Note, Vattel, p. 391. ‡ Comp. Woolsey, Sec. 207.



## PART II.

### WAR.

#### ITS CAUSES, USAGES AND EFFECTS.

War is an interruption of the usual and natural peaceful relations existing between States. It is an "interruption of the state of peace for the purpose of attempting to procure good or prevent evil by force; and a *just* war is an attempt to obtain justice or prevent injustice by force, or, in other words, to bring back an injuring party to a right state of mind and conduct by the infliction of deserved evil."\* Sec. 1. Definition.

"War is that state in which we prosecute our right by force."†

"It is one of the highest trials of right; for, as princes and States acknowledge no superior upon earth, they put themselves upon the justice of God by an appeal to arms."‡

"A contest by force between independent sovereign States is called a public war. If it is declared in form, or duly commenced, it entitles both the belligerent parties to all the rights of war against each other. The voluntary or positive law of nations makes no distinction, in this respect, between a just and unjust war. A war in form, or duly commenced, is to be considered as to its effects, as just on both sides. Whatever is permitted by the laws of war to one of the belligerent parties is equally permitted to the other."§ Sec. 2. Public war.

"Wherever men are formed into a social body, war cannot exist between individuals; the use of force between them is not *war*, but a trespass, cognisable by the municipal law."||

Wars have sometimes been classed as offensive or defensive from the nature of their operations. An offensive war is one in which a nation attacks another. A defensive war is one waged Sec. 3. Offensive and defensive war.

\* Woolsey, Sec. 3.    † Vattel, p. 291.    ‡ Lord Bacon, Vol. III, p. 40.

§ Wheaton, p. 514.

|| Bynkershoek, p. 2.

in self-defence.\* This distinction cannot be regarded as of much force, since it relates to the form of war rather than to its objects. A war undertaken strictly in defence of national rights may, and frequently does, become an offensive war in its operations, since to attack an enemy is often the surest means of defending oneself.

"Offensive wars, however apt to be unjust, have usually some pretext of justice to urge in their favor."†

Sec. 4. Perfect  
and imperfect  
war.

"A *perfect* war is one where a whole nation is at war with another nation, and all the members of both nations are authorized to commit hostilities against all the members of the other, in every case and under every circumstance permitted by the general laws of war. An *imperfect* war is limited as to places, persons, and things."‡ The hostilities authorized by the United States against France in 1798 furnish an example of imperfect war. The Act of Congress of July 9th, of that year, authorized the President, without any declaration of war against France, to instruct the commanders of all public armed vessels of the United States to capture any French armed vessels encountered; and vessels so captured were to be condemned as lawful prizes. The same act also authorized fitting out privateers, but they were to cruise against armed vessels only.

Sec. 5. Just war.

The right of making war belongs to nations only so far as it is necessary for their own defence and the maintenance of their international rights.

"The foundation, or cause of every just war is injury either already done or threatened. The justificatory reasons for war show that an injury has been received, or so far threatened as to authorize a prevention of it by arms. If any one attacks a nation, or violates her perfect rights, he does her an injury and affords a just cause of war.

"If a nation takes up arms when she has received no injury, nor is threatened with any, she undertakes an unjust war. Those alone to whom an injury is done, or threatened, have a right to make war."§

"A just war, again, is one that is waged in the last resort, when peaceful means have failed to obtain redress, or where self-defence calls for it. We have no right to redress our

\* Vattel, p. 293; Lawrence's Wheaton, p. 491, *n.* † Woolsey, Sec. 113.

‡ Lawrence's Wheaton, p. 518. § Vattel, p. 302.

wrongs in a way expensive and violent when other methods would be successful.”\*

“War is not a game of strength between armies or fleets, nor a competition to kill the most men and sink the most vessels; but a grand, valiant appeal to force to secure an object deemed essential when every other appeal has failed. The purpose of using force is to coerce your enemy to the act of justice assumed to be necessary.”†

“From the independence of nations it results that each has a right to hold and make good its own view of right in its affairs. When a quarrel arises between two States, others are not to interfere because their views of the right in the case differ from those of the party concerned; or at least they are not to do this unless the injustice of the war is flagrant and its principles dangerous.”‡

Each State the judge of its own cause.

In the latter case, however, nations may not only remonstrate with the offender, but may use force to prevent the injustice threatened.

“A State bound by treaty to assist another in the event of war, must of course judge whether the *casus fœderis* exists, and is bound to pass judgment on the nature of the war, since no treaty can sanction injustice.”§

An ally must judge of the justice of the war.

“No one can be validly engaged to support injustice.”||

Vattel calls informal, or unlawful war, predatory expeditions, such as the cruisers of buccaneers and the depredations committed by the corsairs of the Barbary Coast States; expeditions undertaken, even where authorized by a sovereign, for no other purpose than plunder.¶

Sec. 6. Informal or unlawful war.

“When a party is formed in a State, who no longer obey the sovereign, and are possessed of sufficient strength to oppose him,—or when, in a republic, the nation is divided into two opposite factions, and both sides take up arms,—this is called a *civil war*. Custom appropriates the term of ‘*civil war*’ to every war between the members of one and the same political society. If it be between part of the citizens on the one side, and the sovereign, with those who continue in obedience to him,

Sec. 7. Civil war.

\* Woolsey, Sec. 3. † Dana’s Wheaton, p. 876, *n.* ‡ Woolsey, Sec. 3.  
§ Woolsey, Sec. 3; Bynkershoek, p. 71. || Vattel, p. 197; Lawrence’s Wheaton, p. 480. ¶ Vattel, p. 319.

on the other,—provided the malcontents have any reason for taking up arms, nothing further is required to entitle such disturbance to the name of *civil war* and not that of *rebellion*.

Rebellion. This latter term is applied only to such an insurrection against lawful authority as is void of all appearance of justice. The sovereign, indeed, never fails to bestow the appellation of *rebels* on all such of his subjects as openly resist him ; but, when the latter have acquired sufficient strength to give him effectual opposition, and to oblige him to carry on the war against them according to the established rules, he must necessarily submit to the use of the term ‘civil war.’”\*

Mixed wars. “A civil war is one in which the opposing parties are distributed over the territory ; while a war in which they are localized may be called a rebellion, insurrection, or revolt. A civil war does not aim at the destruction of unity, but rather at some change of government, constitution or laws, while the other may aim at sundering parts before united. With internal wars international law comes into contact so far as the laws of war, that is, of humanity and natural justice, are concerned, and also in the bearings of the war upon the interests and rights of foreign States.”†

“A civil war between the different members of the same society is what Grotius calls a *mixed* war ; it is, according to him, *public* on the side of the established government, and *private* on the part of the people resisting its authority. But the general usage of nations regards such a war as entitling both the contending parties to all the rights of war as against each other, and even as respects neutral nations.”‡

“In the case where a State attempts to separate itself from the community of which it formed a part, and on which it was dependent, while the parent government seeks to subdue the attempt by the use of force, all the rights of war may be conceded to the insurgents, although no declaration of war has been made and their position as belligerents is not recognized . . . At the commencement of a separation of this kind it is a matter of policy whether the parent portion shall acquiesce in the proposed separation, or attempt to compel continuity by the use of force. If the employment of force is determined upon, it is

\* Vattel, p. 424. † Woolsey, Sec. 136. ‡ Lawrence’s Wheaton, p. 521.

impossible that war should be declared, because that would be to admit the independence of the insurgents, which is the main point in dispute; and yet it is necessary that war should be held to exist, otherwise the parties at issue are not only deprived of their respective rights, but the interests of third parties are compromised.”\*

Referring to the effects of a civil war on the rights and obligations of foreign powers, Mr. Dana says, in his notes on Wheaton's Elements of International Law: Conduct of foreign States during a civil war.

“If it is a war, all foreign citizens and officers, whether executive or judicial, are to follow one line of conduct. If it is not a war, they are to follow a totally different line. If it is a war, the commissioned cruisers of both sides may stop, search and capture the foreign merchant vessel, and the vessel must make no resistance, and must submit to adjudication by a prize court. If it is not a war, the cruisers of neither party can stop or search the foreign merchant vessel, and that vessel may resist all attempts in that direction, and the ships of war of the foreign State may attack and capture any cruiser persisting in the attempt. If it is a war, foreign nations must await the adjudication of prize tribunals. If it is not a war, no such tribunal can be opened. If it is a war, the parent State may institute a blockade *jure gentium* of the insurgent ports, which foreigners must respect; but if it is not a war, foreign nations having large commercial intercourse with a country will not respect a closing of insurgent ports by paper decrees only. If it is a war, the insurgent cruisers are to be treated by foreign citizens and officials, at sea and in port, as lawful belligerents. If it is not a war, those cruisers are pirates, and may be treated as such. If it is a war, the rules and risks respecting carrying contraband, or despatches, or military persons, come into play. If it is not a war, they do not. Within foreign jurisdiction, if it is a war, acts of the insurgents in the way of preparation and equipments for hostility may be breaches of the neutrality laws; while if it is not a war, they do not come into that category, but into the category of piracy or of crimes by municipal law.”†

“The habitual obedience of the members of any political society to a superior authority must have once existed in order

\* Castle, p. 48.

† Dana's Wheaton, p. 35, n.



to constitute a sovereign State. But the temporary suspension of that obedience and of that authority, in consequence of a civil war, does not necessarily extinguish the being of the State, although it may affect for a time its ordinary relations with other States.

The rights of the parties to a civil war.

“Until the revolution is consummated, whilst the civil war involving a contest for the government continues, other States may remain indifferent spectators of the controversy, still continuing to treat the ancient government as sovereign, and the government *de facto* as a society entitled to the rights of war against its enemy; or may espouse the cause of the party which they believe to have justice on its side. In the first case, the foreign State fulfils all its obligations under the law of nations; and neither party has any right to complain, provided it maintains an impartial neutrality. In the latter it becomes, of course, the enemy of the party against whom it declares itself, and the ally of the other; and as the positive law of nations makes no distinction, in this respect, between a just and unjust war, the intervening State becomes entitled to all the rights of war against the opposite party.

“If the foreign State professes neutrality, it is bound to allow impartially to both belligerent parties the free exercise of those rights which war gives to public enemies against each other, such as the right of blockade, and of capturing contraband and enemy's property. But the exercise of those rights, on the part of the revolting colony or province against the metropolitan country, may be modified by the obligation of treaties previously existing between that country and the foreign State.”\*

“Where the sovereign of a neutral State has acknowledged the existence of a war by his proclamation of neutrality, a citizen of that State is estopped from the denying the existence of the war, and the belligerent right of blockade.”†

It is with reference to the above principles of international law, that Mr. Justin McCarthy says, in his “History of Our Own Times,” defending the neutrality proclamation of Great Britain, at the beginning of the war of Secession in the United States: “Yet it is certain that the proclamation was made with no

\* Lawrence's Wheaton, p. 40.

† Suppl. Lawrence's Wheaton, p. 1.



unfriendly motive. It was made at the instance of some of the most faithful friends the Northern cause had on this side of the Atlantic, conspicuous among whom in recommending it was Mr. W. E. Forster. If such a proclamation had not been issued, the English government could not have undertaken to recognize the blockade of the Southern ports.”\*

“A civil war is never publicly proclaimed, *eo nomine*, against insurgents; its actual existence is a fact in domestic history which the courts are bound to notice and know.”†

Civil war is never formally declared.

The President's proclamation of April 19th, 1861, of a blockade of the Southern ports of the United States was a notification to the world that the government claimed the exercise of belligerent, as well as of sovereign rights, and it was held by the courts to be an act of war.

“The United States did not declare war, because they refused to recognize any body politic as opposed to them, or capable of performing any functions of hostility, but claimed to regard the insurrection as a rebellion of individuals risen to the dimensions of a war. They did in practice treat the rebels as belligerents, holding them as prisoners of war, making use of exchanges and other practices of war, but this was from necessity to prevent retaliation, and from humanity. But they refused to recognize any authority in the Confederate States capable even of making a surrender, and neither the existence nor the disappearance of the Confederacy was noticed legally by the United States.”‡

Sedition, conspiracy and popular commotions against the authority of a government are crimes local in their effects, and are left to the control of municipal law. With them international law has no concern.

Sec. 8. Sedition, &c.

Wars may be undertaken against foreign States belonging to the same political system, against nations out of the pale of civilization, pirates, or savages, and by the parts of a State against each other. With these international law has little relation except the first and last.§

Sec. 9. Kinds of war.

The justice, and even the necessity of war, at times, is clear, when it is considered that to States belong, by right of their being, the obligations of protecting themselves and their citizens

Sec. 10. The justice of some wars.

\* Chapter XLIII.

† Suppl. Lawrence's Wheaton, p. 13.

‡ Dana's Wheaton, p. 35.

§ Woolsey, Sec. 113.

from aggressions, the redress of wrongs, and the punishment of evil-doers. "War is a dreadful thing when evil suffered or inflicted is considered; and yet war has often been the restorer of national virtue, which had nearly perished under the influence of selfish luxurious peace."\*

Sec. 11. International law and wars.

International law, then, recognizes the necessity for war at times, and it is, in a great degree, a collection of rules formed from the practice of civilized nations, intended to confine wars in their operations within the closest limits consistent with the objects for which they are undertaken, and to govern those operations on principles of justice and humanity.

Sec. 12. Causes of war.

It belongs to international law to define what constitutes a lawful cause of war, and also to prescribe the means by which redress for injuries may be obtained without a resort to armed force.

Professor Woolsey gives the following summary of lawful causes of war :†

Self-defence.

1. "A State may go to war to defend its sovereignty and independence—that is, its political life and its territory. This reason for war is analogous to the individual's right of self-preservation, and of defending his home when attacked.

Protection of citizens.

2. "The State being bound to protect the individual inhabitant in all his rights, is his only defence against foreign violence, and may redress his wrongs even by war. But here it is reasonable to consider the extent of the injury, and the greatness of the evil which the remedy may involve. A State may forbear to redress its own public wrongs, much more the smaller ones of individuals.

Insults and injuries.

3. "A State may engage in war to obtain satisfaction for violations of its honor, as for insults offered its flag, or its ambassadors, or its good name. A State has a right of reputation, this right is extremely important, and infractions of it cannot fail to arouse a deep sense of wrong in a high-minded people. Redress, therefore, is here as just and natural as suits for libel or slander between individuals. It is plain, however, that every small want of comity or petty insult does not warrant hostile measures, though it may call for remonstrance.

Violations of treaties.

4. "Violations of those rights which nations concede to one another by treaty may call for the redress of war. A contract

\* Woolsey, Sec. 112.

† Int. Law, Sec. 112.

is broken, and there is no court before which the party doing the injury may be summoned.\*

5. "The prevention of intended injury is a ground of war. This, indeed, is a case of self-defence, only the injury must not be remote or constructive, but fairly inferable from the preparations and intentions of the other party.† The injury, again, which is to be prevented may not be aimed directly against a particular State, but may affect the equilibrium of a system of States. Thus the ambition of a leading State, it is now held, may, by disturbing the balance of power in Europe, provoke the interference of others upon the same continent.

Prevention  
injury.

6. "In some rare cases a great and flagrant wrong committed by another nation, against religion, for instance, or liberty, may justify hostile interference on the part of those who are not immediately affected. And this, not only because the wrong, if allowed, may threaten all States, but also because the better feelings of nations impel them to help the injured."

Wrongs done to  
civilization.

"The right of making war, as well as of authorizing reprisals, or other acts of vindictive retaliation, belongs, in every civilized nation, to the supreme power of the State."‡

Sec. 13. The  
war-making  
power.

In the United States the right of levying war is, by the Constitution, expressly conferred upon the Congress as one of the sovereign powers of the general government.§ This right is exercised by Congress in the passage of an act declaring the existence of a state of war, and authorizing the President to use the military and naval forces of the United States to carry the war into effect.

In cases of invasion or insurrection, it has been decided by the Supreme Court of the United States that the President can, alone, inaugurate war in the exercise of his power to call out the militia in such cases. "It is exclusively with the President to decide whether the exigencies provided for have arisen."||

In order to justify the commencement of war it is necessary that a nation has a lawful cause of complaint, that satisfaction has been demanded and refused, and that the government of the injured nation considers it to the advantage of its citizens to prosecute its right by force of arms.

Sec. 14. Decla-  
ration of war.

\*Comp. Part I, Sec. 14.

†Comp. Vattel, p. 302.

‡Lawrence's Wheaton, p. 512.

§Con. U. S., Art. I, Sec. 8.

||Lawrence's Wheaton, p. 514, n.

Bynkershoek on  
declarations of  
war.

"Many things are required by writers on the law of nations in order to make war lawful, and particularly they think it necessary that it be publicly declared, either by a special proclamation or manifesto, or by sending a herald. This opinion certainly accords with the practice of the modern nations of Europe, and it is perfectly clear, that before recourse can be had to arms, a demand of satisfaction should be made for the injury complained of. But this is not the question now before us; it is whether, after a reparation has been demanded and refused, war can be immediately made without a previous declaration?

"My opinion is that a declaration of war is not necessary, and that it is one of those things which may very properly be done, but which cannot be insisted upon as a matter of right. A war may begin by mutual hostilities as well as by a declaration.

"War may be justly begun upon the denial of a just demand; for how does that differ from actual hostilities? I admit, in the fullest extent, that it is necessary in the first instance to make a demand of what we conceive to be due to us, but not that we are to accompany that demand with threats of hostility, or with an actual declaration of war."\*

Vattel on decla-  
rations.

The opinion of Bynkershoek is opposed by Vattel, who says, after enumerating the reasons for taking up arms: "But all this is not sufficient. As it is possible that the present fear of our arms may make an impression on the mind of our adversary and induce him to do us justice, we owe this further regard to humanity, and especially to the lives and peace of the subjects, to declare to that unjust nation, or its chief, that we are at length going to have recourse to the last remedy, and make use of open force for the purpose of bringing him to reason. This is called *declaring war*.

"After a fruitless application for justice, a nation may proceed to a declaration of war, which is then *pure and simple*. But, to include the whole business in a single act, instead of two separate ones, the demand of justice (called by the Romans *rerum repetitio*) may, if we think proper, be accompanied by a *conditional declaration* of war, notifying that we will commence hostilities unless we obtain immediate satisfaction on such and

\* Bynkershoek, pp. 6 and 7.

such a subject. In this case there is no necessity for adding a *pure* and *simple* declaration of war, the *conditional* sufficing, if the enemy delays giving satisfaction.”\*

“A declaration of war being necessary, as a further effort to terminate the difference without the effusion of blood, by making use of the principle of fear, in order to bring the enemy to more equitable settlements; it ought, at the same time that it announces our settled resolution of making war, to set forth the reasons which have induced us to take up arms. This is, at present, the constant practice among the powers of Europe.”†

“War between independent sovereignties is, and ought to be, an *avowed* open way of obtaining justice. For every State has a right to know what its relations are towards those with whom it has been on terms of amity: whether the amity continues, or is at an end. It is necessary, therefore, that some act show in a way not to be mistaken, that a new state of things, a state of war has begun.”‡

The declaration that a state of war exists is necessary as well for the information of neutrals, in consequence of their changed rights and duties during its continuance.

The civilized nations of ancient times generally made a formal declaration of war before commencing any hostile movements. The Romans, in particular, were very punctilious in this respect, and prefaced the declaration of war by a formal demand for reparation for alleged wrongs, giving to the adversary a fixed time, thirty-three days, in which to answer. At the end of this time, satisfaction being denied, war was declared in due form.

In Europe, during the middle ages, it was not considered honorable to commence war without a formal declaration made by heralds at arms, or other messengers. This practice was observed until the first half of the seventeenth century; the last instance in European history of a declaration of war made by heralds at arms, in accordance with the forms used in the middle ages, being that of France against Spain, proclaimed at Brussels in 1635.

“A formal declaration of war to the enemy was once considered necessary to legalize hostilities between nations. The

Sec. 15. What declaration contains.

Sec. 16. The necessity for a declaration.

Sec. 17. Custom of ancient nations.

Sec. 18. Custom of the middle ages.

Sec. 19. Modern usage.

\* Vattel, p. 315.

† Vattel, p. 315.

‡ Woolsey, Sec. 115.



present usage is to publish a manifesto, within the territory of the State declaring war, announcing the existence of hostilities, and the motives for commencing them. This publication may be necessary for the instruction and direction of the subjects of the belligerent State in respect to their intercourse with the enemy, and regarding certain effects which the voluntary law of nations attributes to war in form. Without such a declaration, it might be difficult to distinguish in a treaty of peace, those acts which are to be accounted lawful effects of war, from those which either nation may consider as naked wrongs, and for which they may, under certain circumstances, demand reparation.”\*

“ This disuse of declarations does not grow out of an intention to take the enemy at unawares, which would imply an extreme degradation of moral principles, but out of the publicity and circulation of intelligence peculiar to modern times. States have now resident ambassadors within each other’s bounds, who are accurately informed in regard to the probability of war, and can forewarn their countrymen. War is for the most part the end of a long thread of negotiations, and can be generally foreseen. Intentions, also, can be judged of from the preparations which are on foot, and nations have a right to demand of one another what is the meaning of unusual armaments. And yet the modern practice has its evils, so that one cannot help wishing back the more honorable custom of feudal times.

“ This rule, be it observed, of declaring war beforehand, so long as it was thought obligatory, only bound the assailant. The invaded or defensive State accepted the state of war as a fact, without the formalities of a declaration.”†

Counter declarations, however, were usually made.

Sec. 20. Mani-  
festoes.

“ But if a declaration of war is no longer necessary, a State which enters into war is still bound, (1) to indicate in some way, to the party with whom it has a difficulty, its altered feelings and relations. This is done by sending away its ambassador, by a state of non-intercourse, and the like. (2) It is necessary and usual that its own people should have information of the new state of things, otherwise their persons and property may be exposed to peril. (3) Neutrals have a right to know that a state of war

\* Lawrence’s Wheaton, p. 523; Vattel, p. 316.

† Woolsey, Sec. 115.

exists, and that early enough to adjust their commercial transactions to the altered state of things, otherwise a great injury may be done them. Such notice is given in manifestoes."\*

"War is at present published and declared by manifestoes. These pieces never fail to contain the justificatory reasons, good or bad, on which the party grounds his right to take up arms. The least scrupulous sovereign would wish to be thought just, equitable, and a lover of peace: he is sensible that a contrary reputation might be detrimental to him. The manifesto implying a declaration of war, or the declaration itself, printed, published, and circulated throughout the whole State, contains also the sovereign's general orders to his subjects, relative to their conduct in the war."†

The practice of the United States has been for the President to issue a proclamation containing the Act of Congress which declares a state of war to exist. This proclamation is communicated to neutral governments by the State Department through the diplomatic agents.

The proclamation is necessary as calling to the notice of all citizens the date of the passage of the act declaring war to exist. "The date of the Act of Congress, therefore, furnishes the precise period of the commencement of the peculiar duties and obligations which a condition of war imposes on the citizen."‡

The United States have made several treaties regulating commerce and navigation with foreign powers, in which it is stipulated that neither of the contracting parties shall, in case of dispute, or any infraction of said treaties, declare war, or authorize any act of reprisals, until after a statement of the injuries complained of, accompanied by competent proof, shall have been presented by the offended party, and satisfaction refused or unreasonably delayed.

These treaties are with Algiers, 1816, Bolivia, 1858, Brazil, 1828, United States of Colombia, 1846, Ecuador, 1839, Guatemala, 1849, Mexico, 1831 (revived by treaty of 1848), Portugal, 1840, San Salvador, 1850, Tripoli, 1805, Tunis, 1797.§

War having been declared, a nation has the right to take any measures, consistent with humanity, necessary to attain the

Sec. 21. Treaties of the U. S. as to declarations of war.

Sec. 22. The laws of war.

\* Woolsey, Sec. 116.

† Vattel, p. 318.

‡ Upton, p. 7.

§ Treaties of U. S., 1873, "Bolivia," &c.



object in view ; whether it be to resist aggression, or to obtain satisfaction for injuries received.

The laws and usages of war "are necessarily somewhat vague and fluctuating, partly because they have less to do with justice than with humanity when clear lines are wanting; partly because much must be left to the discretion of commanders with varying dispositions and principles; partly because nations sometimes enter with excited passions, sometimes with cool calculation, into war, and their spirit will modify all its movements. Notwithstanding this vagueness, the rules of war have grown in humanity and mildness in recent times."\*

Few wars of modern times have failed to show some advance in the direction of the avoidance of suffering caused. The greater care of the wounded, the respect shown hospitals and ambulance corps, and the liberty of action allowed the agents of sanitary commissions all testify to this.

The principal causes of this amelioration are :

- Influence of Christianity in war. 1. The influence of Christianity in fostering a feeling of brotherhood among men. Prisoners of war are no longer considered as enemies whose lives are forfeited, and civilization having condemned slavery, they are not looked upon as slaves to the captor, but as entitled to humane treatment.
- Influence of writers. 2. The influence, generally, of writers on the law of nations and the usages of war, and the examples of great military leaders. Bynkershoek, however, is an exception in this respect, as he advocates the lawfulness of any and all means of injuring an enemy.†
- Effect of commerce. 3. The increased commercial intercourse between modern nations. The subjects of different nations are no longer strangers to each other, but are bound together by many ties of business and friendship.
- Improved discipline in armies. 4. The separation of the military class from the non-combatants, and the improved discipline in armies rendered possible by this separation. The regular troops of a nation form at least a basis for its armies in war, and their spirit and discipline pervade to a great extent the whole military organization.
- Improved methods of warfare. 5. The higher feeling of honor among officers, the better control they are able to exercise over their men, and the cooler

\* Woolsey, Sec. 124.

† Chap. I, "War in general."

and more scientific manner in which modern warfare is conducted, give little occasion for the exercise of passion.

6. The difference in the mode of action, caused by the use of gunpowder and the modern arms of precision. The soldier of to-day rarely comes to a hand-to-hand conflict with his enemy, as in ancient times, and sees little of the suffering caused. He does not see his peculiar victim, and so does not become accustomed to the act of killing and wounding which made men savages in action.

7. The organization of a regular commissariat, and the modern systems of finance and credit, by which armies are maintained in the field in an enemy's country, and the soldier no longer finds it necessary to resort to plunder to sustain himself.\* Supply departments.

"The rules which lie at the basis of a humane system of war are: Sec. 23. General rules of war.

"1. That peace is the normal state of Christian nations, to which they are bound to seek to return from the temporary and exceptional interruption of war.

"2. That redress of injuries, and not conquest or plunder, is the lawful motive in war; and that no rule of morality or justice can be sacrificed in the mode of warfare.

"3. That war is waged between governments by persons whom they authorize, and is not waged against the passive inhabitants of a country.

"4. That the smallest amount of injury, consistent with the sad necessity of war, is to be inflicted. And, finally,

"5. That the duties implied in the improved usages of war, so far as they are not of positive obligation, are reciprocal, like very many rules of intercourse between States, so as not to be binding on one belligerent as long as they are violated by the other."†

Bynkershoek says, of the relations between enemies, "Justice in war is indispensable; but generosity is altogether a voluntary act. That leaves us at liberty to destroy an enemy by every possible means, this grants to him everything that we could wish to be granted to ourselves in the like case; and thus war is carried on, as a duel formerly was in those countries in which

\* Woolsey, Sec. 124.

† *Ibid.* Sec. 125.

that mode of terminating differences was admitted.”\* He goes so far as to say that everything is *lawful* against an enemy, even the use of poison.

Sec. 24. Weapons that are allowable.

The law of nations, now recognized, prohibits the use of poisoned weapons and missiles, and such as are intended only to inflict bad and painful wounds. The attempted use of explosive rifle balls, during the War of Secession in the United States, was condemned as opposed to the laws of war. Poisoning, or in any other manner assassinating an enemy, is forbidden. Poisoning springs and water-courses is equally prohibited, although the water supply of a besieged place may be diverted.†

Many arms and missiles, as for instance chain-shot on board ships, were formerly prohibited, that could now be used without question at the will of a belligerent. The present practice in war is to make use of the most destructive weapons of offence, and mechanical ingenuity is stimulated to the highest point in the invention and manufacture of new and more terrible means of destruction. The use of mines and torpedoes, both on land and at sea, is increasing, and nothing is said against the wholesale loss of life they are intended to cause. It may almost be said that the modern tendency is to make war so destructive that no nation will engage in it. It is a fact, however, that since the invention of gunpowder, the suffering and loss of life in battle have been much lessened, and the same may be asserted of the introduction of the modern arms of precision. Wars have been very much shortened in duration by these means, and the aggregate loss of life in modern warfare has been much less than in ancient times, when the soldier met his enemy in hand-to-hand conflict, and a victory meant almost complete extermination of the vanquished army.‡

Sec. 25. The troops that may be employed.

Modern usage has established a permanent military organization for duty in time of peace, and to serve as the basis of all the armies of a nation in the time of war. Thus, during a war, in addition to the regular forces, it is customary to call into service the militia or volunteers, who are uniformed and subjected to the same discipline as the regular troops, and who become, for the time they are in service, in all respects a part of the regular

Volunteers. military establishment. The volunteers have then all the rights

\* Chap. I, “War in general.”

† Vattel, p. 361; Woolsey, Sec. 127.

‡ Hall, p. 457.

and immunities granted to regular troops, and are not to be confounded with guerilla bands.

"Partisan and guerilla troops are bodies of men self-organized Guerillas. and self-controlled, who carry on war against the public enemy, without being under the direct control of the State. They have no commissions or enlistments, nor are they enrolled as any part of the military force of the State; and the State is, therefore, only indirectly responsible for their acts. Such partisan and guerilla bands are regarded as outlaws, and, when captured, may be punished as freebooters and banditti. If authorized and employed by the State, they become a portion of its troops, and the State is as much responsible for their acts as for the acts of any other part of its army."\* They are no longer partisans or guerillas, but are in every respect on the same footing as other troops.

"International law makes a distinction between the unauthorized acts of guerilla bands, and the authorized acts of *levées en masse* organized and armed by the State. When such militia are called into the field, and organized under the constituted authorities of the State, they are entitled to all the rights of war."†

Mercenary troops are foreigners voluntarily serving a State Mercenaries. for pay alone. The custom of employing mercenaries, once almost universal in Europe, has fallen into complete disuse. Such a practice could not be successfully defended, since the act of engaging in war from no other motive than private gain is clearly repugnant to every principle of morality and justice. Yet Vattel favors such enlistments, on the ground that their own country would be benefited by the knowledge of the art of war acquired by the mercenaries.‡

"The noble view of gaining instruction in the art of war, and thus acquiring a greater ability to render useful services to their country, has introduced the custom of serving as volunteers even in foreign armies; and the practice is undoubtedly justified by the sublimity of the motive. At present, volunteers, when taken by the enemy, are treated as if they belonged to the army in which they fight."§

\* Lawrence's Wheaton, p. 95, n. † Halleck, p. 334. ‡ Vattel, p. 297.

§ *Ibid.* p. 400.

Modern custom permits a few of the officers of the neutral States to accompany armies in the field, to observe military movements, and the use of new arms, in order to report upon them to their governments. Such officers are protected by passports.

Employment of  
savages.

"Nothing is clearer than that troops who are accustomed to an inhuman mode of warfare, and belong to a savage race, cannot be trusted to wage war according to the spirit of humanity, and ought not to be employed."\*

Nevertheless, the practice of employing savages in warfare between civilized nations has been allowed by the rules of war, and many instances of it are afforded by modern history.

The French, as late as 1859, brought the "Turcos," a force enlisted in North Africa, into Italy to take part in the operations against Austria. Great Britain habitually made use of savages in her wars in North America, and in 1877 threatened to use her Indian troops in Europe, bringing a body of Sepoys to Malta, as a menace to Russia, after the treaty of San Stefano had been published and pending the meeting of the Berlin Conference.

Sec. 26. The  
enlistment of  
troops.

"As a war cannot be carried on without soldiers, it is evident that whoever has the right of making war has naturally that of raising troops. The latter, therefore, belongs to the sovereign. The power of levying troops, or raising an army, is of too great consequence in a State to be entrusted to any other than the sovereign. The subordinate authorities are not invested with it; they exercise it only by order or commission from the sovereign. But it is not always necessary that they should have an express order for the purpose. On those urgent exigencies which do not allow time to wait for the supreme order, the governor of a province, or the commandant of a town, may raise troops for the defence of the town or province committed to their care; and this they do by virtue of the power tacitly given them by their commission in cases of this nature."†

The Constitution of the United States confers upon Congress the power to raise and support armies, and to make rules for enlistments.‡ The President has the power, under the act of Congress of February 28th, 1795, to call the militia into active

\* Woolsey, Sec. 127.

† Vattel, p. 293.

‡ Art. I, Sec. 8.



service, when the country shall be invaded, or be in imminent danger of invasion by an enemy, or when necessary to suppress an insurrection.\*

“Every citizen is bound to serve and defend the State as far as he is capable. Society cannot otherwise be maintained ; and this concurrence for the common defence is one of the principal objects of every political association. Every man capable of bearing arms should take them up at the first order of him who has the the power of making war. Obligations of citizenship.

“In former times, and especially in small States, every man became a soldier immediately on a declaration of war ; the whole community took up arms, and engaged in the war. Soon after, a choice was made, and armies were formed of picked men,—the remainder of the people pursuing their usual occupations.

“No person is naturally exempt from taking up arms in the defence of the State,—the obligation of every member of society being the same. Those alone are exempted who are incapable of handling arms, or supporting the fatigues of war.”†

This positive view of the obligation of the citizens in time of war is greatly modified by the present customs of civilization ; classes of non-combatants being recognized by municipal law as well as by the law of nations.

At the present time, nations guard very jealously the right of enlisting troops within their territory ; not only as an attribute of their sovereignty, but to avoid complications with other States. Laws are passed prohibiting the enlistment of troops for the service of foreign powers, and prescribing severe penalties for their violation. Such are the Neutrality Act of the United States and the Foreign Enlistment Act of Great Britain. Foreign enlistments.

The penalty, in the United States, for enlisting in the military service of a country at war with another between which and the United States peace exists, or for inducing others to so enlist, or engaging to go beyond the limits of the United States for such purpose, is fine, not exceeding one thousand dollars, and imprisonment, not exceeding three years. The act is made applicable to all persons within the limits of the United States, Penalties for foreign enlistments.

\* Brightly's Digest, p. 621.

† Vattel, pp. 293, 294.



except such subjects of foreign States as may be temporarily residing there.\*

Sec. 27. Who are  
enemies.

"The enemy is he with whom a nation is at open war.

"When the sovereign or ruler of a State declares war against another State, it is understood that the whole nation declares war against another nation; for the sovereign represents the nation, and acts in the name of the whole society. Hence those two nations are enemies, and all the subjects of the one are enemies to all the subjects of the other. In this particular custom and principle are in accord."†

Kent. "When war is duly declared, it is not merely a war between this and the adverse government, in their political characters. Every man is, in judgment of law, a party to the acts of his own government, and a war between the governments of two nations is a war between all the individuals of the one, and all the individuals of which the other nation is composed. Government is the representative of the will of all the people, and acts for the whole society. This is the theory of all governments, and the best writers on the law of nations concur in the doctrine that when the sovereign of a State declares war against another sovereign, it implies that the whole nation declares war, and that all the subjects of the one are enemies to all the subjects of the other."‡

Upton. "An alien enemy is one who is under the allegiance of a government at war with our own.

"Where the allegiance due is of that permanent character which attaches to the citizen or subject, as such, there is no difficulty in determining his position and liabilities. His hostility is coeval with, and as permanent as, his allegiance. It begins with the commencement of his country's quarrel, and ends only with its termination."§

Supreme Court  
of U. S.

These definitions accord with the decisions of the Supreme Court of the United States, as to the position and obligations of citizens during war. In the war with Mexico it was held that in a state of war, the nations engaged in it, and all their citizens or subjects as well, are enemies of each other. ||

\* Brightly's Digest, p. 688; see also "Neutrality." † Vattel, p. 321.

‡ Kent, Vol. I, p. 63.

§ Upton, p. 44.

|| Lawrence's Wheaton, p. 552, n.

The exact definition of enemies given above applies more particularly to the business relations of the belligerents. It is not understood that each and every citizen shall, under all possible circumstances, commit acts of direct hostility against the enemy.

"The old strict theory in regard to a state of war was, that each and every subject of the one belligerent is at war with each and every subject of the other. . . . It is needless to say that no Christian State acts on such a theory, nor did the Greeks and Romans generally carry it out in practice to its extreme rigor. In particular there is now a wide line drawn between combatants and non-combatants, the latter of whom, by modern practice, are on land exempted from the injuries and molestations of war, as far as is consistent with the use of such a method of obtaining justice."\* Sec. 28, Combatants.

"A combatant is any person directly engaged in carrying on war, or concerned in the belligerent government, or present with its armies and assisting them; although those who are present for purposes of humanity and religion, as surgeons, nurses and chaplains, are usually classed as non-combatants, unless special reasons require an opposite treatment of them."†

"The effect of a state of war, lawfully declared to exist, is to place all the subjects of each belligerent power in a state of mutual hostility. The usage of nations has modified this maxim, by legalizing such acts of hostility only as are committed by those who are authorized by the express or implied command of the State. Such are the regularly commissioned naval and military forces of the nation, and all others called out in its defence, or spontaneously defending themselves in case of urgent necessity, without any express authority for that purpose. The horrors of war would be greatly aggravated if every individual of the belligerent State was allowed to plunder and slay indiscriminately the enemy's subjects, without being in any way accountable for his conduct. Hence it is that in land wars, irregular bands of marauders are liable to be treated as lawless banditti, not entitled to the protection of the mitigated usages of war as practiced by civilized nations."‡ General effect of war.  
  
Who may commit acts of hostility.

"All the members of the enemy State may lawfully be treated as enemies in a public war; but it does not therefore follow Sec. 29, Non-combatants.

\* Woolsey, Sec. 117.

† *Ibid.* 128.

‡ Lawrence's Wheaton, p. 626.

that all these enemies may be treated alike ; though we may lawfully destroy some of them, it does not therefore follow that we may lawfully destroy all. For the general rule, derived from the natural law, is still the same, that no use of force against an enemy is lawful unless it is necessary to accomplish the purposes of war. The custom of civilized nations, founded upon this principle, has heretofore exempted the persons of the sovereign and his family, the members of the civil government, women and children, artisans, laborers, cultivators of the earth, merchants, men of science and letters, and, generally, all other public or private individuals engaged in the ordinary civil pursuits of life, from the direct effect of military operations, unless actually taken in arms, or guilty of some misconduct in violation of the usages of war by which they forfeit their immunity.”\*

Classification.

Fishermen.

Fishermen also are generally classified as non-combatants, and are allowed to pursue their avocations unmolested, except where interrupted by actual warlike operations.

The treaty of 1785 between the United States and Prussia contained a stipulation that fishermen, “and in general all others whose occupations are for the common subsistence and benefit of mankind,” should be classed as non-combatants.

Treaty of 1871.

A treaty of the United States with Italy, concluded in 1871, contains the same stipulations, and is, by its terms, to be as sacredly observed, in the event of war between the parties, “as the most acknowledged obligations of the law of nations.”†

Conduct of non-combatants.

Non-combatants are required to remain passive and take no part in any hostile movement, but they may use force to defend themselves from aggression. If the people of an invaded district take an active part in hostilities, they forfeit their claim to immunity.

“The true theory seems to be, that private persons on each side are not fully in hostile relations, but in a state of non-intercourse, in a state wherein the rights of intercourse, only secured by treaty and not derived from natural right, are suspended or have ceased, while the political bodies to which they belong are at war with one another, and they only. Of course until these political bodies allow hostile acts to be performed, such acts,

\* Lawrence's Wheaton, p. 591.

† U. S. Treaties, 1873, p. 509.

save in self-defence, may not be performed; and accordingly the usages of war visit with severity those who fight without a sanction of their governments. The plunder which such persons seize belongs not to themselves, but to the public, until public authority gives them a share in it.”\*

The enemy's allies are those who unite with him in carrying on war, or furnish him with assistance of any kind in his operations, or are engaged with him in an offensive alliance. Sec. 30. Allies of the enemy.

Vattel would allow certain assistance to be furnished a belligerent, under treaty stipulations entered into before the commencement of a war, and holds it not inconsistent with neutrality, but, at present, such conduct on the part of any nation would be a lawful cause of war.† But he also says: “It is of little consequence whether any one makes war on me directly, and in his own name, or under the auspices of another. Whatever rights war gives me against my principal enemy, the like it gives me against all his associates; for I derive those rights from the right to security,—from the care of my own defence; and I am equally attacked by the one and the other party.”

“As their own conduct proclaims them my enemies, and they take up arms against me in the first instance, I may make war on them without any declaration; the war being sufficiently declared by their own act. This is especially the case of those who in any manner whatever, concur to make an offensive war against me.”‡

“The sovereign declaring war can neither detain the persons nor the property of those subjects of the enemy who are within his dominions at the time of the declaration. They came into his country under the public faith. By permitting them to enter and reside in his territories, he tacitly promised them full liberty and security for their return. He is, therefore, bound to allow them a reasonable time for withdrawing their effects; and if they stay beyond the term prescribed, he has a right to treat them as enemies,—as unarmed enemies, however. But if they are detained by an insurmountable impediment, as by sickness, he must necessarily, and for the same reason, grant them a sufficient extension of the time.”§ Sec. 31. Enemy's subjects in the belligerent's territory.

\* Woolsey, Sec. 119; see “Prize, Capture, &c.”

† Vattel, p. 328.

‡ Vattel, p. 318.

§ *Ibid.* pp. 327–330.

"The usage is now general, if not fixed, with the single exception of measures of retorsion, to allow the subjects of the enemy to remain within the territory during good behavior, in the enjoyment of their property, or to give them, by public proclamation, reasonable time to withdraw with their effects from the country."\*

While some modern writers claim that the right to detain the persons of enemies found within the belligerent territory, and to confiscate their property, still exists in full force, except where modified by treaty stipulations, they admit the general usage to be as above stated.†

The Supreme Court of the United States has held, however, that while the declaration of war does not of itself legalize proceedings for the confiscation of the property of resident enemies, it does vest the right to confiscate; the assertion of the right depending on the will of the supreme authority of the nation.‡

In the later treaties made by the United States, a term is fixed, varying from six months to a year, which shall be allowed citizens of either party to arrange their business and withdraw with their effects from the enemy's territory.

The treaty of 1859 with Paraguay allows citizens of either party engaged in business to remain in the territory, under the protection of law, as long as they behave peaceably and commit no offence; but if "they prefer to leave the country, they shall be allowed the time they may require to liquidate their accounts and dispose of their property."§ This seems to refer to merchants especially. By the treaties with Mexico, 1848, San Salvador, 1850, United States of Colombia, 1846, and Bolivia, 1858, merchants are required to quit the country within a fixed term, while all other enemy's citizens may remain under protection. Other treaties made by the United States make no discrimination in this respect.||

Sec. 32. Prisoners of war.

"We have a right to repel an attack by force, and to use such force as may be necessary, even to taking the lives of our assailants. Under the name of enemies are to be classed not only the authors of war, but also those who join them or aid them in any way. But the very right to kill our enemies where

\* Woolsey. † Upton, p. 37; Kent, p. 66; Lawrence's Wheaton, p. 531, n.

‡ Cranch's Rep., Vol. VIII, p. 110. § Treaties of U. S., 1873, p. 659.

|| *Ibid.* pp. 552, 752, 185, 88.



necessary, contains in itself a limitation, and where milder means of self-defence are sufficient, they must be adopted. This is the origin of the right to make prisoners of war. In battle those who lay down their arms must be given quarter, and in a siege, a garrison offering to surrender are never refused terms of capitulation."\* Quarter to be allowed.

"There is, however, one case in which we may refuse to spare the life of an enemy who surrenders, or to allow any capitulation to a town reduced to the last extremity. It is when that enemy has been guilty of some enormous breach of the law of nations, and particularly when he has violated the laws of war. This refusal of quarter is no natural consequence of the war, but a punishment for his crime—a punishment which the injured party has a right to inflict. But in order that it be justly inflicted it must fall on the guilty. When we are at war with a savage nation, who observe no rules and give no quarter, we may punish them in the persons of any of their people whom we take (these belonging to the number of the guilty), and endeavor, by this rigorous proceeding, to force them to respect the laws of humanity. But wherever severity is not absolutely necessary, clemency becomes a duty."†

Fortunately the cases are very rare in modern warfare where a resort to the rule of *no quarter* is necessary.

"No use of force is lawful except so far as it is necessary. A belligerent has, therefore, no right to take away the lives of those subjects of the enemy whom he can subdue by any other means. Those who are actually in arms, and continue to resist, may be lawfully killed; but the inhabitants of the enemy's country who are not in arms, or who being in arms submit and surrender themselves, may not be slain, because their destruction is not necessary to the just ends of the war. Those ends may be accomplished by making prisoners of those who are taken in arms, or compelling them to give security that they will not bear arms against the victor for a limited period, or during the continuance of the war. The killing of prisoners can only be justifiable in those extreme cases where resistance on their part, or on the part of others who come to their rescue, renders it impossible to keep them."‡

\* Vattel, p. 347; Bynkershoek, pp. 19, 20.

† Vattel, p. 348.

‡ Lawrence's Wheaton, p. 588.



Joining with  
savages.

Persons who identify themselves with savages, however, in war are not entitled to the protection afforded prisoners of war by the usages of civilization, but may be executed upon capture.

The execution, by order of General Jackson, of two English subjects, during the Florida Indian war in 1818, was held to be justifiable, even by their own government, they having taken part with savages in commencing war against the United States. They were regularly tried and sentenced to death by a Court Martial, but by the laws and usages of war they might have been hanged without formal trial, the commander-in-chief having full proof of their guilt.\*

Sec. 33. Treat-  
ment of pris-  
oners.

Prisoners of war are, by modern usage, furnished with necessary comforts at the expense of the State to which they belong. If the circumstances of the captor are such as do not admit of proper care, humanity would dictate their immediate release on parole.

"Prisoners may be secured and be subjected to such confinement as may be necessary for this object. They may be put in irons if there is any apprehension of their attempting to escape. They are not to be treated harshly unless guilty of some crime."†

"Persons escaping from captivity and retaken, or even recaptured in war, are not held to merit punishment, for they only obeyed their love of liberty."‡

Prisoners of war escaping to a neutral territory are, of course, free. No act of war being permitted in neutral territory, they cannot be pursued and retaken, nor can any demand be made on the neutral for their surrender.

Sec. 34. Ex-  
change of  
prisoners.

"The State is bound to procure, at her own expense, the release of her citizens and soldiers who are prisoners of war, as soon as she has the means of accomplishing it, and can do so without danger. It is her duty to provide for their support during the time of their captivity."§

"The present usage of exchanging prisoners of war was not firmly established in Europe until some time in the course of the seventeenth century. Even now, this usage is not obligatory among nations who choose to insist upon a ransom for prisoners

\* Lawrence's Wheaton, p. 589, n.

† Woolsey, Sec. 128.

‡ Vattel, p. 353.

§ Vattel, p. 353.

taken by them, or to leave their own countrymen in the enemy's hands until the termination of the war.

"Cartels for the mutual exchange of prisoners of war are regulated by special convention between the belligerent States."\*

"Good faith and humanity ought to preside over the execution of these compacts, which are designed to mitigate the evils of war, without defeating its legitimate purposes. By the modern usage of nations, commissaries are permitted to reside in the respective belligerent countries to regulate and carry into effect the arrangements necessary for this object. Breaches of good faith in these transactions can only be punished by withholding from the party guilty of such violation, the advantages stipulated by the cartel, or, in cases which may be supposed to warrant such a resort, by reprisals or vindictive retaliation."†

Prisoners of war are frequently permitted to return to their own country without an exchange, on parole, or agreement not to serve again during the war, or until regularly exchanged. On several occasions during the War of Secession in the United States, officers were permitted to return home to arrange an exchange, but on condition of returning within the enemy's lines by a fixed date should the exchange not be effected. All arrangements of this nature must be respected by the State. Sec. 35. Parole.

"As every commander necessarily has a power of agreeing to the conditions on which the enemy admits his surrender, the engagements entered into by him for saving his life, or his liberty, with that of his men, are valid, as being made within the limits of his powers, and his sovereign cannot annul them."‡ Authority to give parole.

In a cartel between the United States and the Confederate forces, made in July, 1862, by officers commissioned to arrange for a general exchange of prisoners, the following articles appear :

"4. No officer, soldier or employé, in the service of either party is to be considered as exchanged and absolved from his parole, until his equivalent has actually reached the lines of his friends.

"5. The parole forbids the performance of field, garrison, guard or police, or constabulary duty."

Violation of parole is punishable with death ordinarily. The case of Colonel Hayne, who was executed by the British in Sec. 36. Punishment for breach of parole.

\* Lawrence's Wheaton, p. 589.

† Lawrence's Wheaton, p. 590.

‡ Vattel, p. 354.

South Carolina, for an alleged breach of parole, during the American Revolution, was made the subject of discussion in the British House of Lords, and it appeared that very different views were held as to the punishment merited for breach of parole. On one side it was claimed that in case of breach of parole the offender might be hanged at once, with only such trial as necessary to identify him; and the authority of Lord Cornwallis was cited to show that during his command in America, that practice had been followed on several occasions. On the other hand, it was asserted that such had not been the practice of English commanders in former wars; that offenders in this respect should be punished by stricter confinement, as guilty of an ignominious crime, but it had never entered into the mind of a commander to hang them.\*

During the war between the United States and Mexico, General Scott, the American Commander-in-Chief, threatened to hang every one who should be taken in arms in violation of his parole. This was done in reference to the conduct of the Mexican government. The Mexican authorities had endeavored, by proclamation, to induce their soldiers, liberated on parole by the American forces, to regard their parole as void, and they had also, in some cases, forced their paroled soldiers to reënter the army.†

Sec. 37. Measures of retaliation.

Measures of retaliation in war are admissible, and may at times become necessary for the protection of prisoners in the hands of a vindictive and unjust enemy. Retaliation, indeed, may at times be the only means of protecting the lives of prisoners in the hands of an enemy.

No rule for measures of retaliation can be laid down, as these must be governed by the particular circumstances in each case. The limit to be placed on such measures is that they do not justify crimes and breaches of faith. It may be said, generally, that although brave men shrink from the infliction of suffering upon non-combatants and helpless prisoners, a government solicitous for the welfare and safety of its subjects, would not hesitate to resort to acts of retaliation, however severe, in case of necessity, and that firm and just military commanders would execute them.

During the War of Secession in the United States, certain

\* Lawrence's Wheaton, p. 594, n.

† Halleck, p. 438.

privateersmen, acting under commissions from the Confederate States, were indicted under the statute defining piracy, and brought to trial before the United States District Courts at New York and Philadelphia, in October, 1861. This was made the occasion of retaliatory measures on the part of the Confederates, and a corresponding number of United States officers, held by them as prisoners of war, were selected whose treatment and ultimate fate were to be exactly that of the privateersmen. In January, 1862, an executive order was issued directing the transfer of the privateersmen, including those already convicted at Philadelphia, to military prisons for the purpose of exchanging them as prisoners of war. The action of the government in this case, and in subsequently putting Confederate privateersmen on the same footing as officers and men of the navy, may be considered as an admission that they could not be held guilty of piracy, and any measures of retaliation adopted by the Confederates would have been justifiable, they having all the rights of belligerents during the war.

In consequence of the emancipation proclamation of President Lincoln, of January 1st, 1863, the President of the Confederacy threatened to treat as criminals all commissioned officers of the United States engaged in carrying out any of its provisions, and to deliver them to the local authorities in each State to be dealt with in accordance with their laws for the punishment of the crime of inciting servile insurrection.\* This was a position that could not be sustained, and in no case was the threat put into execution.

"The employment of spies is a kind of clandestine practice, or deceit, in war. Spies are generally condemned to capital punishment, and with great justice, since we have scarcely any other means of guarding against the mischief they may do us."†

Sec. 38. Spies and their treatment.

"A general rule of war allows the punishment of death to be inflicted upon spies who are found in disguise within the lines of an army. But military spies in their regimentals, when taken, are treated as ordinary prisoners of war."‡

To justify the infliction of the death penalty, spies must be taken before they reach the lines of their own army; subsequent capture does not warrant punishment.

\* Message to Con. Congress, Jan. 12, 1863.

† Vattel, p. 375.

‡ Woolsey, Sec. 135.

Articles of war. "All persons who, in time of war, or rebellion against the supreme authority of the United States, come or are found in the capacity of spies, or who bring or deliver any seducing letter or message from an enemy or rebel, or endeavor to corrupt any person in the navy to betray his trust, shall suffer death, or such other punishment as a court martial may adjudge."\*

The same punishment is prescribed for holding intercourse with an enemy or rebel, without authority, for receiving any letter or message from an enemy or rebel, or being aware of the unlawful receipt of such communications and not immediately informing the Commander-in-Chief or the commander of a vessel.

The usual mode of punishment is by hanging, as being the most disgraceful.

Persons in balloons.

"A strong inclination was shown by the Germans during the war of 1870 to treat as spies persons passing over the German lines in balloons. 'All persons,' says Colonel Walker, in writing to Lord Granville, 'who attempt to pass the Prussian outposts without permission, whether by land, water or air,' were 'deported to Prussia under suspicion of being French spies'; and it was declared by Count Bismarck, in writing of an English subject captured in a balloon, that apart from the fact that he was suspected to be the bearer of illicit correspondence, his arrest and trial by court martial 'would have been justified, because he had spied out and crossed our outposts and positions in a manner which was beyond the control of the outposts, possibly with a view to make use of the information thus gained, to our prejudice.' Neither secrecy, nor disguise, nor pretence being possible to persons travelling in balloons, the view taken by the Germans is inexplicable; and it is satisfactory to notice that the treatment of balloon travellers as spies was forbidden in the proposed Declaration of Brussels, and that their right to be treated as prisoners of war is affirmed in the French official manual for the use of military officers."†

In view of the improvements being made in balloon navigation, this question will probably come up for definite determination in the near future.

\* Act of Congress, July 17, 1862.

† Hall, p. 464.



"Deserters merit severe and exemplary punishment; and the sovereign may, if he thinks necessary, annex the penalty of death to desertion."<sup>\*</sup> Sec. 39. Desertion.

The punishment of death, or such other punishment as a court martial may adjudge, may be inflicted upon any person in the naval service who, in time of war, deserts or entices others to desert."<sup>†</sup>

"Fugitives and deserters, found by the victor among his enemies, are guilty of a crime against him; and he has undoubtedly a right to put them to death. They are perfidious citizens, traitors to their country; and their enlistment with the enemy cannot obliterate that character or exempt them from the punishment they have deserved."<sup>‡</sup>

Vattel speaks of a custom, no longer observed, of allowing the garrison, evacuating a surrendered place, a certain number of covered wagons in which deserters were placed to save them from detection, and as he says, to avoid too frequent executions.

"Deserters from the Army and Navy of the United States, who did not within sixty days after the President's proclamation of March 11th, 1865, return to their commands, or report themselves to a provost marshal, are deemed to have forfeited their citizenship, as well as their right to become citizens of the United States; and such deserters shall be forever incapable of holding any office of honor or trust under the United States, or of exercising any of the rights of citizens."<sup>§</sup>

While it is dishonorable to induce persons in the service of an enemy to betray their trusts, it, nevertheless, is done, and acts of treason when successful are rewarded.|| Sec. 40. Traitors.

"To lead the officers, counsellors, or troops of an enemy to treachery by bribes, or to seduce his subjects to betray their country, are temptations to commit a plain crime, which no hostile relation will justify. Yet to accept the services of a traitor is allowable."<sup>¶</sup>

Woolsey makes an exception in the case of a nation conquered, and under the rule of a usurper, when it should be considered allowable, he says, to incite the people to revolt.

\* Vattel, p. 298.

† Vattel, p. 351.

‡ Vattel, p. 375.

† Act of July 17, 1862.

‡ Act of Congress, March 13, 1865.

¶ Woolsey, Sec. 127.



Sec. 41. Good  
faith towards  
an enemy.

"The faith of *promises and treaties* is the basis of the peace of nations. It is sacred among men, and absolutely essential to their common safety. It is certain that the promises and treaties are to be held sacred in war as well as in peace, between enemies as well as between friends. All promises made to an enemy in the course of a war are obligatory. But conventions made during a war are like all other compacts and treaties, of which the reciprocal observance is a tacit condition; we are no longer bound to observe them towards an enemy who has himself been the first to violate them."\*

Stratagems al-  
lowable.

But while we are bound to hold sacred all promises to an enemy, and keep all engagements, expressed or implied, we may take any advantage of an enemy possible by stratagem or surprise without perfidy; indeed to make use of such means is highly commendable. On this account the circulation of any intelligence calculated to deceive an enemy is allowable.

A vessel may hoist false colors to decoy an enemy within range of her guns, but to make signals of distress for such a purpose would be an act of the greatest perfidy. Vattel mentions the reported case of an English frigate making signals of distress off Calais, and making prisoners of some French sailors who went to her assistance; and says that, if true, such an action deserves a severe punishment.†

Sec. 42. Truce  
or armistice.

"There are various modes in which the extreme rigor of the rights of war may be relaxed at the pleasure of the respective belligerent parties. Among these is that of a suspension of hostilities, by means of a truce or armistice. This may be either general or special. If it be general in its application to all hostilities in every place, and is to endure for a very long or indefinite period, it amounts in effect to a temporary peace, except that it leaves undecided the controversy in which the war originated. Such were the truces formerly concluded between the Christian powers and the Turks. Such, too, was the armistice concluded in 1609, between Spain and her revolted provinces in the Netherlands. A partial truce is limited to certain places, such as the suspension of hostilities, which may take place between two contending armies, or between a besieged fortress and the army by which it is invested."‡

\* Vattel, p. 371.

† *Ibid.* p. 374.

‡ Lawrence's Wheaton, p. 685.

"A general truce can be made only by the sovereign power, or its agents, specially empowered for this purpose. A special or partial truce may be concluded, according to the law of nations, by a military officer, even by a subordinate one within his district. This usage rests on the consideration that both policy and humanity require that such a discretionary power should be lodged in those who, being on the spot, can best understand the exigencies of the case. If an officer should be restricted in the use of this power contrary to usage, and yet should exercise it, his agreement, at least if not corruptly made, would be binding on his sovereign, provided that the other party knew nothing of the restriction. For that party had a right to infer from prevalent usage, and the nature of the command entrusted to him, that he had this power."\*

Who may enter  
into a truce.

The convention made between General Sherman and the Confederate General Johnson, in April, 1865, for a suspension of hostilities, and the disbandment of the remaining Confederate armies, was set aside by the government, on the ground that the former had exceeded the powers entrusted to a military commander in making arrangements affecting the subsequent status of persons who had been engaged in rebellion, that could only be legally made by the supreme authority of a nation.

Halleck calls a cessation of hostilities for a very short period and for a definite purpose, as for burying the dead and recovering the wounded after a battle, a "suspension of arms"; applying the phrase "truce" or "armistice" to cases of longer continuance, and for general or remote purposes.†

"A suspension of hostilities binds the contracting parties, and all acting immediately under their direction, from the time it is concluded; but it must be duly promulgated in order to have a force of legal obligation with regard to other subjects of the belligerent States; so that if, before such notification, they have committed any act of hostility, they are not personally responsible, unless their ignorance be imputable to their own fault or negligence. But as the supreme power of the State is bound to fulfil its own engagements, or those made by its authority, express or implied, the government of the captor is bound, in the case of a suspension of hostilities by sea, to restore all prizes made in contravention of the armistice. To prevent the

Effects of a  
truce.

\* Woolsey, Sec. 148.

† Halleck, p. 654.

disputes and difficulties arising from such questions, it is usual to stipulate in the convention of armistice, as in treaties of peace, a prospective period within which hostilities are to cease, with a due regard to the situation and distance of places.”\*

“If any of the subjects, whether military men or private citizens, offend against the truce, this is no violation of the public faith; nor is the truce thereby broken. But the delinquents should be compelled to make ample compensation for the damage, and severely punished. Should their sovereign refuse to do justice, on the complaints of the party injured, he thereby becomes accessory to the trespass, and violates the truce.”†

Violation of a  
truce.

Any violation of a truce is an injury to the other party, and he may commence active hostilities at once, except where a penalty has been reciprocally stipulated, in which case the truce still holds until satisfaction is refused.‡

The general rule governing a truce is, that neither party shall do anything to the prejudice of the other, which could be prevented during active operations, but which the truce affords the opportunity of doing.§

The right of a garrison in a place under siege to repair and strengthen its defences, during a truce, is maintained by some writers; but is denied by others of such authority as Bynkershoek, Vattel and Wheaton. The authors that would allow the besieged to repair his defences during a truce would prohibit the besieging force from adding to its works of attack.||

“The question is whether to strengthen works of offence or defence is an act of hostility, and consistent with a promise to suspend hostilities. It would appear that neither party can thus act in good faith, unless it can be shown that the usages of war have restricted the meaning of truce to the suspension of certain operations. The rule then laid down by Vattel, and which he is obliged to qualify by several others, namely, that each may do among themselves, that is, within their own territories or where they are respectively masters, what they would have the right to do in peace, is true only of the general operations of war. A power may use the interval in collecting its forces,

\* Lawrence's Wheaton, p. 686. † Vattel, p. 406.

‡ *Ibid.* p. 407.

§ Woolsey, Sec. 149; Vattel, p. 408.

|| Vattel, p. 409; Bynkershoek, p. 194.

strengthening its works which are not attacked, and the like. But when we come to the case of besieged towns, the question is of what are the two parties masters, and various quibbles might be devised to allow either of them' to do what he pleased. 'The governor of a town,' says Vattel, 'may not repair breaches or construct works which the artillery of the enemy would render it dangerous to labor upon during siege, but he may raise up new works or strengthen existing ones to which the fire or attacks of the enemy were no obstacle.' Why, if this be so, may not the besiegers strengthen their works which are not exposed to the guns of the fortress?''\*

Vattel says: "The truce concluded between the governor of a town and the general besieging it, deprives both of the liberty of continuing their works. With regard to the latter, this is manifest—his works being acts of hostility. But neither can the governor, on his part, avail himself of the armistice for the purpose of repairing the breaches or erecting new fortifications. . . . But the suspension of arms does not hinder the governor from continuing within his own town such works as were not liable to be impeded by the attacks or fire of the enemy."†

It is necessary that the time of the truce be accurately specified, in order to prevent all doubt or dispute respecting the period of its commencement and that of its expiration.

"In national compacts, the word '*day*' is to be understood of a natural day, since it is this meaning that a day is the common measure of time among nations. The computation by civil days owes its origin to the civil law of each nation, and varies in different countries. The natural day begins at sunrise, and lasts twenty-four hours, or one diurnal revolution of the sun. If, therefore, a truce of one hundred days be agreed upon, to begin on the first of March, the truce begins at sunrise on the first of March, and is to continue a hundred days of twenty-four hours each."‡

Duration of a truce.

Where no time is specified for the commencement of a truce, it is binding on the parties immediately, and must be published at once.

At the expiration of a truce, concluded for a specified time, hostilities recommence without notice. "Every one who

\* Woolsey, Sec. 149.

† Vattel, p. 409.

‡ *Ibid.* pp. 407-408.

lingers freely in the enemy's country, or within his lines, after this date, is obnoxious to the law of war. But forced delay on account of illness, or other imperative reason, would exempt such a one from harsh treatment."\*

"If the truce has been concluded for an indefinite, or for a very long period, good faith and humanity concur in requiring previous notice to be given to the enemy of an intention to terminate what he may justly regard as equivalent to a treaty of peace."†

Sec. 43. Capitulations.

"Capitulations for the surrender of troops and fortresses fall naturally within the scope of the general powers intrusted to military and naval commanders. Stipulations between the governor of a besieged place and the general or admiral commanding the forces by which it is invested, if necessarily connected with the surrender, do not require the subsequent sanction of their respective sovereigns. Such are the usual stipulations for the security of the religion and privileges of the inhabitants, that the garrison shall not bear arms against the conquerors for a limited period, and other like clauses properly incident to the particular nature of the transaction. But if the commander of a fortified town undertake to stipulate for the perpetual cession of that place, or enter into other engagements not fairly within the scope of his implied authority, his promises amounts to a mere *sponsion*."‡ That is, an agreement not binding unless ratified by the sovereign authority.

Such was the convention entered into by General Sherman and General Johnston, noticed in the preceding section.

Sec. 44. Flags of truce.

"A flag of truce is used when a belligerent wishes to enter into negotiations with his enemy. The person charged with the negotiation presents himself to the latter accompanied by a drummer or a bugler and a person bearing a white flag. As belligerents have the right to decline to enter into negotiations, they are not obliged to receive a flag of truce; but the persons bearing it are inviolable; they must not therefore be turned back by being fired upon, and any one who kills or wounds them intentionally is guilty of a serious infraction of the laws of war.

"If, however, they present themselves during the progress of an engagement, a belligerent is not obliged immediately to put

\* Woolsey, Sec. 149. † Lawrence's Wheaton, p. 687. ‡ *Ibid.* p. 687.



a stop to his fire, the continuance of which may be of critical importance to him, and he cannot be held responsible if they are then accidentally killed. If the enemy receives persons under the protection of a flag of truce he engages by implication to suspend his war with respect to them as long as the negotiation lasts; he cannot therefore make them prisoners, and must afford them the means of returning safely within their own lines; but a temporary detention is permissible if they are likely to be able to carry back information of importance to their army. Effectual precautions may always be taken to prevent the acquisition of such knowledge; bearers of flags of truce may for example be blindfolded, or be prevented from holding communication with other persons than those designated for the purpose of having intercourse with them.

"It is a necessary consequence of the obligation to conduct the non-hostile intercourse of war with good faith, that a belligerent may not make use of a flag of truce in order to obtain military information; and though its bearer is not expected to refrain from reporting whatever he may learn without effort on his own part, any attempt to acquire knowledge surreptitiously exposes him to be treated as a spy. Deserters, whether bearing or in attendance upon a flag of truce, are not protected by it; they may be seized and executed, notice being given to the enemy of the reason of their execution."\*

Must not be used to obtain information.

"In the Instructions to the United States Armies of April 24, 1863, Sec. 14, it is declared, that 'if it be discovered and fairly proved that a flag of truce has been abused for surreptitiously obtaining military knowledge, the bearer of the flag thus abusing his sacred character is deemed a spy,' yet great caution is enjoined in convictions of that description, on account of the great utility of flags of truce, and the good faith to be observed towards as well as by their bearers."†

The Navy Regulations of the United States, published in 1876, contain full instructions to officers as to the use and reception of flags of truce.‡

"Passports and safeguards, or safe-conducts, are letters of protection, with or without an escort, by which the person of an enemy is rendered inviolable. These may be given to carry on

Sec. 45. Passports, safeguards and safe-conducts.

\* Hall, p. 465.

† Dana's Wheaton, p. 345, n.

‡ Chap. XXI, p. 137.



the peculiar commerce of war, or for reasons which have no relation to it, which terminate in the person himself.”\*

They may also be issued to protect vessels from capture, or to exempt any species of property from hostile seizure.

The right to exempt the persons and property of the enemy's subjects from the operations of war is vested in the sovereign authority of a State. “This sovereign authority may be vested in military and naval commanders, or in certain civil officers, either expressly or by inevitable implication from the nature and extent of their general trust. Such documents are to be interpreted by the same rule of liberality and good faith with other acts of the sovereign power.”†

A safeguard or passport issued by one commander must be respected by all others of the same State.‡

“Any person holding a passport who remains within the enemy's lines beyond the period for which it was granted, may be treated as a prisoner of war, unless some unavoidable detention can be shown. If he acts as a spy, or is discovered in any intrigue, he forfeits the protection of his passport, as he thus abuses it to commit an act of hostility. Even where the officer giving the passport is privy to his design the case is the same. Arnold's pass to André could be of no avail when once his true character was brought to light.”§

Passports are not transferable, since the persons to whom they are granted cannot know if the authority issuing them would consent to their use by others.

“If the safe-conduct is granted, not for persons, but for certain effects, those effects may be removed by others besides the owner. The choice of those who remove them is indifferent, provided there do not lie against them any personal exception sufficient to render them objects of just suspicion in the eye of him who grants the safe-conduct, or to exclude them from the privilege of entering his territories.”||

A passport protects the person holding it, not only within the territory of the grantor, but also wherever he has control by the presence of his forces.¶

\* Woolsey, Sec. 147. Bynkershoek, p. 195.

† Lawrence's Wheaton, p. 690.

‡ Vattel, p. 416.

§ Woolsey, Sec. 147.

|| Vattel, p. 416.

¶ *Ibid.*

"In bombarding towns, it is difficult to spare the finest edifices. At present we generally content ourselves with battering the ramparts and defences of a place. To destroy a town with bombs and red-hot balls is an extremity to which we do not proceed without cogent reasons. But it is nevertheless warranted by the laws of war, when we are unable by any other mode to reduce an important post, on which the success of the war may depend, or which enables the enemy to annoy us in a dangerous manner. It is also sometimes practiced when we have no other means of forcing an enemy to make war with humanity, or punishing him for some instance of outrageous conduct. But it is only in cases of the last extremity, and with reluctance, that good princes exert a right of so rigorous a nature."\*

Sec. 46. Bombardments.

"Modern usage in sieges and storms, though in some respects very harsh, shows an advance in humanity. There is a distinction to be made between *forts* and *fortified towns*. Any means of assailing a fort may be used that are likely to be successful, but many generals abstain from bombarding a garrisoned town, and resort to storming in order to save the inhabitants; or if the nature of the place or anything else renders bombardment necessary, they give notice to the inhabitants, that they may retire to a place of safety. It was a proceeding worthy only of barbarians when Suchet drove the people of Lerida, in Catalonia, into the citadel, then threw shells among the unprotected multitude, and compelled the governor to capitulate by such an appeal to his humanity. Formerly, it was regarded somewhat in the light of a crime if a commander of a fortress held out as long as he could, and instances may be adduced where such officers were put to death for their obstinacy. Now, in ordinary cases, surrender at discretion only reduces the soldiers to the state of prisoners of war. A commander who should blow up the works of his fortress, and break through a blockading army, would, according to the opinion of some, be doing an act contrary to the laws of war; but this does not appear to be true, although the blockader might be justified in refusing quarters to those, or at least to those officers who should seek thus to deprive them of the fruit of their toils."†

\*Vattel, p. 368.

†Woolsey, Sec. 132.

Modern feeling. The capture of Plevna by the Russians, in the late Turkish war, showed a marked change in feeling in this respect. The Turkish commander, Osman Pasha, was treated with every respect and consideration by the captors, as a gallant enemy who had used every means to prolong the defence of his post, and at last, in despair of holding out longer, attempted to break through the Russian lines with his command.

An officer who should destroy or disable the guns of a fort or injure the works, after a surrender, or while negotiations were in progress for a surrender, would be guilty of an act of perfidy that would merit severe punishment.

The bombardment of Charleston, S. C., in 1863, by General Gillmore, was undertaken in connection with operations for the reduction of the works defending that place, and was clearly in accordance with the laws of war, although protests were made by the Confederate authorities. Ample notice was given of the intention to open fire on the city, in order that non-combatants might withdraw, and the notice of bombardment was given only after a formal demand had been made for the surrender of the forts and batteries that no longer served to protect it. The bombardment of the city of Strasburg by the Prussians in 1870 was a similar case.

The bombardment of the unfortified city of Valparaiso, by the Spanish fleet, in March, 1865, was in consequence of an insult to the Spanish flag, followed by war, and a persistent refusal on the part of the Chilian government to give any satisfaction. The Admiral commanding, who was also entrusted with diplomatic functions, was instructed to make demand for a salute to the Spanish flag by a fixed date, and to enforce this demand, if necessary, by a bombardment of Valparaiso. The demand was made accompanied by a notice that one month from its date the Spanish fleet would move into the harbor, and firing a blank charge, would wait an hour for the required salute before commencing the bombardment, when should it be refused, the vessels would open fire, directing their guns at the public buildings only. Notice was given that all private property would be respected as far as possible, and a request was made that churches and hospitals should be distinguished by flags that they might be carefully avoided.

"It has already appeared that the usages of naval warfare are

more like those relating to attacks on forts, than like those which control ordinary land operations; and even submarine instruments of death, exceptionable as they are, are not yet discarded. A word remains to be said in regard to the treatment of seaports and coasts by vessels of the enemy. For a long time it was lawful to descend upon coasts, bombard towns, levy contributions, and burn places which refused to pay them. . . . More recent operations have shown a milder spirit."\*

The prevailing usage of modern, as of ancient warfare, has been to give full license to the troops of the victor to plunder a fortified place taken by storm, and instances of this are found as late as the Peninsular war. But this practice is now condemned by the public opinion of all civilized nations, and a commander who should allow his troops to plunder and commit outrages on the inhabitants of a place carried by storm would meet with general condemnation. In none of the later wars between civilized nations has such a practice been permitted.†

"If it is lawful to take away the property of an unjust enemy to weaken or punish him, the same motives justify us in destroying what we cannot conveniently carry away. Thus, we waste a country, and destroy the provisions and forage, that the enemy may not find a subsistence there; we sink his ships when we cannot take them or bring them off. All this tends to promote the main object of the war; but such measures are only to be pursued with moderation, and according to the exigencies of the case."‡ To destroy the resources of a country is condemned, except where it is done as a punishment for some gross violation of the law of nations.§

"General mitigations of the extreme rights of war, considered as a contest of force, all grow out of the same original principle of natural law, which authorizes us to use against an enemy such a degree of violence, and such only, as may be necessary to secure the object of hostilities. The same general rule, which determines how far it is lawful to destroy the persons of enemies, will serve as a guide in judging how far it is lawful to ravage or lay waste their country. If this be necessary, in order to accomplish the just ends of war, it may be lawfully done, but not otherwise. Thus, if the progress of an enemy cannot be

Sec. 47. Places taken by storm.

Sec. 48. Ravaging an enemy's country.

\* Woolsey, Sec. 135. See section 24, this chapter.

† Woolsey, Sec. 132.

‡ Vattel, p. 366.

§ *Ibid.*

stopped, nor our own frontiers be secured, or if the approaches to a town intended to be attacked cannot be made without laying waste the intermediate territory, the extreme case may justify a resort to measures not warranted by the ordinary purposes of war. If modern usage has sanctioned any other exceptions, they will be found in the right of reprisals or vindictive retaliation. The whole international code is founded upon reciprocity. The rules it prescribes are observed by one nation in confidence that they will be so by others. Where, then, the established usages of war are violated by an enemy, and there are no other means of restraining his excesses, retaliation may justly be resorted to by the suffering nation, in order to compel the enemy to return to the observance of the law which he has violated.”\*

**Devastation.** “Devastation is capable of being regarded independently as one of the permitted kinds of violence used in order to bring an enemy to terms, or as incidental to certain military operations, and permissible only for the purpose of carrying them out. Formerly it presented itself in the first of these aspects. Grotius held that ‘devastation is to be tolerated which reduces an enemy in a short time to beg for peace,’ and in the practice of his time it was constantly used independently of any immediate military advantage accruing from it.”†

“The destruction of the town of Newark by the American troops during their retreat from Canada in 1813, and of the public buildings at Washington by the English in 1814, may be classed together as wholly unnecessary and discreditable. The latter case was warmly animadverted upon by Sir J. Mackintosh in the House of Commons; and since that time not only have no instances occurred, save by indulgence in an exceptional practice to be mentioned presently, but opinion has decisively laid down that, except to the extent of that practice, the measure of permissible devastation is to be found in the strict necessities of war.

“The right being thus narrowed, it is easy to distinguish between three groups of cases, in one of which devastation is always permitted, while in a second it is always forbidden, and in a third it is permitted under certain circumstances. To the

\* Lawrence’s Wheaton, p. 598. See p. 609 Wheaton for examples.

† Hall, p. 458.



first group belong those cases in which destruction is a necessary concomitant of ordinary military action, as when houses are razed or trees cut down to strengthen a defensive position, when the suburbs of a fortified town are demolished to facilitate the attack or defence of the place, or when a village is fired to cover the retreat of an army. Destruction, on the other hand, is always illegitimate when no military end is served, as is the case when churches and public buildings, not militarily used, and so situated or marked that they can be distinguished, are subjected to bombardment in common with the houses of a besieged town. Finally, all devastation is permissible when really necessary for the preservation of the force committing it from destruction or surrender.”\*

The exceptional practice referred to by Hall is that of bombarding a fortified town to compel a surrender of its defences. This he condemns strongly, but admits that it is sanctioned by usage.

“For whatsoever cause a country is ravaged, we ought to spare those edifices which do honor to human society, and do not contribute to increase the enemy’s strength—such as temples, tombs, public buildings, and all works of remarkable beauty.”†

“By the modern usage of nations, which has now acquired the force of law, temples of religion, public edifices devoted to civil purposes only, monuments of art and repositories of science, are exempted from the general operations of war.”‡

Buildings to be spared.

“Even military hospitals are spared, if not misused for a hostile purpose.”§

But every kind of fortification may be destroyed, as also arsenals and manufactories of any warlike material.||

“Instead of the custom of pillaging the open country and defenceless places, another mode has been substituted, which is at once more humane and more advantageous to the belligerent sovereign—I mean that of *contributions*. Whoever carries on a just war has a right to make the enemy’s country contribute to the support of his army, and toward defraying all the charges of the war. Thus he obtains a part of what is due him; and the enemy’s subjects by consenting to pay the sum demanded, have

Sec. 49. Military requisitions and contributions.

\* Hall, p. 460. General Sherman to Mayor of Atlanta, in Sept., 1864.

† Vattel, p. 368.

‡ Lawrence’s Wheaton, p. 596.

§ Woolsey, Sec. 131.

|| Vattel, p. 368.



their property secured from pillage, and the country is preserved. But a general who wishes to enjoy an unsullied reputation must be moderate in his demand of contributions, and proportion them to the ability of those on whom they are imposed.”\*

“The regulated seizure of private property is effected by the levy of contributions and requisitions. Contributions are such payment in money as exceed the produce of the taxes, which, as has been already seen, are appropriated as public property. Requisitions consist in the render of articles needed by the army for consumption or temporary use, such as food for men and animals, and clothes, wagons, horses, railway material, boats, and other means of transport, and of the compulsory labor, whether gratuitous or otherwise, of workmen to make roads, to drive carts, and for other such services. The amount both of contributions and requisitions is fixed at the will of the invader ; the commander of any detached body of troops being authorized under the usual practice to requisition objects of immediate use, such as food and transport, while superior officers are alone permitted to make demands for clothing and other articles for effecting the supply of which some time is necessary, and contributions can be levied only by the commander-in-chief, or by the general of a corps acting independently. Hostages are sometimes seized to secure the payment or render of contributions and requisitions ; and when the amount demanded is not provided by the time fixed, the invader takes such measures as may be necessary to enforce compliance at the moment or to guard by intimidation against future disobedience. Receipts, or ‘bons de réquisition,’ are given in acknowledgment of the sums or quantities exacted, in order that other commanders may not make fresh impositions without knowing the extent of those already levied, and to facilitate the recovery by the inhabitants from their own government of the amounts paid, if the latter determines on the conclusion of peace to spread the loss suffered over the nation as a whole.

“The usage is in course of formation tending to abolish or restrain within specific limits the exercise of the right to levy contributions and requisitions. The English on entering France in 1813, the army of the United States during the Mexican War, and the allied forces in the Crimea, abstained wholly or in the

Who may levy  
contributions.

\* Vattel, p. 366.

main from the seizure of private property in either manner ; but in each case the conduct of the invader was dictated solely by motives of temporary policy, and his action is thus valueless as a precedent. There is nothing to show that the governments of any of the countries mentioned have regarded the levy of contributions and requisitions as improper ; and that of the United States, while allowing its generals in Mexico to use their discretion as to the enforcement of their right, expressly affirmed it in the instructions under which they acted. One of the articles of the proposed Declaration of Brussels, had it become law, would have deprived the invader of all right to levy contributions except in the single case of a payment in money being required in lieu of a render in kind, and would therefore have enabled him at a maximum to demand a sum not greater than the value of all articles needed for the use and consumption of the army and not actually requisitioned. But so long as armies are of the present size it may be doubted whether the inhabitants of an occupied territory would gain much by a rule under which an invader would keep possession of so liberal a privilege ; and though the representatives of some minor States put forward the view that a belligerent ought to pay or definitely promise to pay for requisitioned articles, the scheme of the declaration as finally settled gave to the right of requisition the entire scope which is afforded by the so-called ' necessities ' of war. It must not be forgotten that in the war of 1870-1 the right of levying contributions and requisitions was put in force with more than usual severity."\*

During the War of Secession in the United States the War Department, in an order dated July 22, 1862, directed " that the military commanders within the States of Virginia, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, and Arkansas, in an orderly manner, seize and use any property, real or personal, which may be necessary or convenient for their several commands, as supplies or for other military purposes, and while such property may be destroyed for military objects, none shall be destroyed in wantonness or malice." This was made the occasion of an order from the Confederate government, of August 1, 1862, threatening retaliation.

" Foraging consists in the collection by troops themselves of Foraging.

\* Hall, p. 362, seq.

forage for horses, and of grain, vegetables, or animals as provision for men, from the fields or other places where the materials may be found. This practice is resorted to when from want of time it would be inconvenient to proceed by way of requisition. With it may be classed the cutting of wood for fuel or military use.”\*

The army of General Sherman on its march through Georgia, in November and December, 1864, was largely supported by supplies taken from the country without any compensation being given.

In the treaty concluded between the United States and Italy in 1871, it is stipulated that where private property is taken for the use of the army of either party, being at war, it shall be paid for at a reasonable price.† This stipulation was contained in the treaty of Guadalupe Hidalgo which closed the Mexican War, and also in the treaty with Prussia of 1785; but in the latter treaty that provision was omitted when it was renewed in 1798.‡

Military occupation produces no effect upon private property except in special cases and in the application of the right of imposing military contributions. The ownership of such property may change in the same manner and under the same laws precisely as if no war existed.§

That the nation beaten in war should be called upon to help defray the expenses of the conqueror is a well established principle of the laws of war. The Germans, after the Franco-Prussian war of 1870-1, in addition to retaining the provinces of Alsace and Lorraine, exacted a large war indemnity from France. Among the demands of Chili upon Peru at the close of the late war in South America, were the cession of a valuable portion of her territory and the payment of an indemnity. The present hostilities (1884) carried on by France and China are for the purpose of enforcing the payment of a war indemnity by the latter.

Sec. 50. Private property of enemies in belligerent territory.

“Property belonging to an enemy which is found by a belligerent within his own jurisdiction, except property entering territorial waters after the commencement of war, may be said to enjoy a practical immunity from confiscation; but its different

\* Hall, p. 368.

† U. S. Treaties, 1873; Italy, p. 509.

‡ *Ibid.* pp. 572-713.

§ Halleck, p. 789.

kinds are not protected by customs of equal authority, and although seizure would always now be looked upon with extreme disfavor, it would be unsafe to declare that it is not generally within the bare rights of war.

"In one case a strictly obligatory usage of exemption has no doubt been established. Money lent by individuals to a State is not confiscated, and the interest payable upon it is not sequestrated. Whether this habit has been dictated by self-interest, or whether it was prompted by the consideration that money so lent was given 'upon the faith of an engagement of honor, because a Prince cannot be compelled like other men in an adverse way by a Court of Justice,' it is now so confirmed that in the absence of an express reservation of the right to sequester the sums placed in its hands on going to war, a State in borrowing must be understood to waive its right, and to contract that it will hold itself indebted to the lender and will pay interest on the sum borrowed under all circumstances.

"Real property, merchandise and other movables, and incorporeal property other than debts due by the State itself, stand in a less favorable position. Although not appropriated under the usual modern practice, they are probably not the subjects of a thoroughly authoritative custom of exemption."\*

"But however strong the current of authority in favor of the modern and milder construction of the rule of national law on this subject, the point seems to be no longer open for discussion in this country; and it has been definitely settled, in favor of the ancient and sterner rule, by the Supreme Court of the United States. The effect of war upon British property found in the United States, on land, at the commencement of the war, was learnedly discussed and thoroughly considered, in the case of *Brown*; and the Circuit Court of the United States, at Boston, decided, as upon a settled rule of the law of nations, that the goods of the enemy found in the country, and all the vessels and cargoes found afloat in our ports, at the commencement of hostilities, were liable to seizure and confiscation; and the exercise of the right rested in the discretion of the sovereign of the nation. When the case was brought up, on appeal, before the Supreme Court of the United States, the broad principle was assumed that war gave to the sovereign full right to take

Decision of U. S.  
Supreme Court.

\* Hall, p. 368-9.

the persons and confiscate the property of the enemy wherever found; and that the mitigations of this rigid rule, which the wise and humane policy of modern times had introduced into practice, might, more or less, affect the exercise of the right, but could not impair the right itself. Commercial nations have always considerable property in the possession of their neighbors; and when war breaks out, the question, what shall be done with the enemy's property found in the country, is one rather of policy than of law, and is one properly addressed to the consideration of the legislature, and not to the courts of law. The strict right of confiscation of that species of property existed in Congress, and without a legislative act authorizing its confiscation it could not be judicially condemned; and the Act of Congress of 1812, declaring war against Great Britain, was not such an act. Until some statute, directly applying to the subject, be passed, the property would continue under the protection of the law, and might be claimed by the British owner at the restoration of peace.

"Though this decision established the right, contrary to much of modern authority and practice, yet a great point was gained over the rigor and violence of the ancient doctrine, by making the exercise of the right to depend upon a special Act of Congress."\*

Treaty stipulations.

The treaties of commerce negotiated by the United States generally contain stipulations for the immunity from seizure and confiscation of all enemy's property found within the belligerent territory at the commencement of war.†

"Enemy property entering territorial waters after the commencement of war is subject to confiscation.

"Apart from an indulgence which has sometimes been granted in recent wars, the only exceptional practice which claims to be of some authority is one exempting from capture shipwrecked vessels, and vessels driven to take refuge in an enemy's port by stress of weather or from want of provisions. There are one or two cases in which such exemption has been accorded.

"Some writers, without asserting that a rule of exemption exists, think that justice, or humanity or generosity demands that a belligerent shall refuse to profit by the ill-fortune of his enemy. Whether this be so or not—and in the case of a ship

\* Kent, p. 69.    † U. S. Treaties, 1873, Bolivia, Ecuador, Italy, &c.



of war at any rate a generosity would seem to be somewhat misplaced which furnishes arms for an adversary, and puts them into his hands without making any condition as to their use—it is clear that a belligerent lies under no legal obligations in the matter.”\*

The exceptional indulgence referred to is based on that principle of the Declaration of Paris, that “the neutral flag covers the cargo of the enemy, except when it is contraband of war.”

The usage of nations engaged in the most recent wars has been not only to exempt from seizure enemy's vessels in belligerent ports at the commencement of hostilities, giving them sufficient time to quit such ports and reach a place of safety; but also to afford them immunity from capture when bound to a belligerent's ports in ignorance of the war. From the beginning of the Crimean War are dated certain customs relating to the treatment of merchant vessels that, even if not to be regarded as establishing any principle in maritime international law, will almost certainly be followed in a great degree by commercial nations engaged in hostilities.†

By a British Order in Council, of March 29, 1854, six weeks were allowed to Russian vessels to finish discharging cargo and quit British ports in safety. An Order in Council, of April 15, referring to the Order of March 29, directed that any Russian merchant sailing from any foreign port to any port in Her Majesty's dominions, should be permitted to enter such port, discharge her cargo, and depart immediately without molestation; and such vessels were not to be stopped unless bound to a port under blockade. Russian merchant vessels, sailing from Russian ports on the Baltic Sea or White Sea, prior to May 15, 1854, and bound to any British port, were to be permitted to enter such port, discharge cargo and depart without molestation. An order of the French government, issued March 27, 1854, allowed Russian vessels not actually in French ports, or which had sailed from Russian ports before the declaration of war, to enter French ports and remain until May 9, inclusive, for the purpose of completing their cargoes. Russian vessels that might be captured by French cruisers after leaving their home ports were to be released if it could be

Time allowed to  
quit an enemy's  
port.

\* Hall, p. 374.

† See Part X, “Privateering.”



shown by the ship's papers that they had not yet arrived at their destination.\*

Similar indulgences had been allowed by the governments of Russia and Turkey, at the commencement of the war in October, 1853, and were extended by Russia to the merchant vessels of France and Great Britain when those powers declared war against her.

At the commencement of the War of Secession in the United States, the Confederate Congress, by an Act passed in May, 1861, allowed vessels belonging to the citizens of the United States in Confederate ports thirty days to quit port, and such vessels and their cargoes, unless contraband, were not to be subject to capture during this period unless they had previously reached their ports of destination. Vessels that had been in the service of the United States after April 6th, 1861, were excepted from any indulgence.†

The Act of Congress of July 17th, 1861, allowed a period of fifteen days in which vessels belonging in whole or in part to citizens of any State which should be declared by the President to be in a state of insurrection, should be allowed to depart without molestation. Such vessels, after the period of fifteen days from the date of such proclamation, whether at sea or in a port of the rest of the United States, were to be forfeited on capture.‡

In 1870 France allowed German vessels which were taking in cargo at the date of the declaration of war, to enter French ports without limit as to time, and to quit such ports under safe-conduct for a German port.§

Sec. 51. Trade  
with the en-  
emy.

"It follows from the nature of war, as an interruption of peaceful intercourse, that all commerce between the belligerents is unlawful, unless expressly licensed, or necessary for the war itself. Hence partnerships with an enemy are dissolved, and all power of prosecuting claims through the courts of the enemy is suspended during the war; and all commercial transactions with the subjects or in the territory of the enemy, of whatever kind, except ransom contracts, whether direct or indirect, as through an agent or partner who is a neutral, become illegal and void."||

\* Lawrence's Wheaton, p. 533, n. † Moore's Reb. Record, Vol. II, p. 195.

‡ U. S. Statutes, 1861, p. 257. § Hall, p. 383. || Woolsey, Sec. 117.

"During the Mexican War, it was held, by the Supreme Court of the United States, that in a state of war the nations who are engaged in it, and all their citizens and subjects, are enemies to each other. Hence all intercourse or communication between them is unlawful. Attempts were made to evade the rule of public law by the interposition of a neutral port between the shipments from the belligerent port and their ultimate destination in the enemy's country; but in all such cases the goods were condemned as having been taken in a course of commerce rendering them liable to confiscation."\*

"Not only is such intercourse with the enemy, on the part of the subjects of the belligerent State, prohibited and punished with confiscation in the Prize Courts of their own country, but, during a conjoint war, no subject of an ally can trade with the common enemy, without being liable to forfeiture, in the Prize Courts of the ally, of his property engaged in such trade."†

The strict interpretation of the rule of non-intercourse in war laid down by our Supreme Court is sometimes greatly relaxed in modern war. During the Crimean War, the governments of Great Britain and Russia gave their subjects general permission to carry on trade with the enemy, provided such trade was conducted in neutral vessels, excepting trade in articles contraband of war, and with ports under blockade. Telegraphic communication was freely permitted when not of a political nature.‡

"The effect of this order is, therefore, to leave the trade of this country with neutrals, and even the indirect trade with Russia, in the same state it was during peace, as far as the law of our courts maritime is concerned, and the doctrine of illegal trading with the enemy is at an end. The restrictions henceforth to be imposed are solely those arising out of direct naval and military operations; such as blockade, and those which the enemy may think fit to lay upon British and French property. As far as we are concerned, except that British ships are not to enter Russian ports, which it is obvious that they could not do without incurring the risk of a forfeiture of their property and the imprisonment of their crews, and which may be otherwise objectionable, on certain grounds of policy into which it is not necessary to enter in this place, the trade may be lawfully

\* Lawrence's Wheaton, p. 552, n. † *Ibid.* ‡ *Ibid.* p. 533, n.

carried on in any manner which the ingenuity and enterprise of our merchants may devise.”\*

Sec. 52. License  
to trade.

“It is not unusual, however, for a belligerent to grant to its own subjects a license to carry on a certain specified trade with the enemy, which, if the other party allows it, becomes a safe and legitimate traffic. It is common, also, for the subjects of one belligerent to obtain such license from the other; but of course, this of itself will not protect them against the laws of their own country.”†

Who may grant  
licenses.

“The sovereign alone has authority to grant licenses. In the *Hoop*, Lord Stowell said: ‘By the law and constitution of this country, the sovereign alone has the power of declaring war and peace. He alone, therefore, who has the power of entirely removing the state of war, has the power of removing it in part, by permitting, when he sees proper, that commercial intercourse which is a partial suspension of the war.’ And in the case of the *Hope*, that Judge lays down still further the law on this point. ‘The instrument of protection, in order to be effectual, must come from those who have a competent authority to grant it . . . . *It is quite clear that no consul in any country, particularly in an enemy’s country, is vested with any such power in virtue of his station; neither does an admiral on any station possess such authority.* He has, indeed, power relative to the ships under his immediate command, and can restrain them from committing acts of hostility; but he cannot go beyond that. *He cannot grant a safeguard of this kind beyond the limits of his own station.*’”

“Licenses being high acts of sovereignty, they are necessarily *stricti juris*, and must not be carried further than the intention of the great authority which grants them may be supposed to extend, not necessarily to be construed with pedantic accuracy, or that every small deviation should be held to vitiate the fair effect of them; but the two circumstances required to give the due effect to a license are—first, that the intention of the grantor shall be pursued; and secondly, that there shall be an entire *bona fides* on the part of the user.”‡

An Act of Congress, passed July 13, 1861, authorized the President of the United States to license trade with any part of

\* Lawrence’s Wheaton, 553.

† Woolsey, Sec. 117.

‡ Castle, pp. 40-1-2.

a State or section, the inhabitants of which were declared in a state of insurrection, under regulations to be established by the Secretary of the Treasury.\*

Another exception to the rule that all transactions with an enemy are illegal, is found in the custom of giving ransom bonds in cases of capture at sea.

Sec. 53. Ransom of vessels captured by an enemy.

"It may, for various reasons, be inconvenient to send a prize into port, and a captor so situated will be apt, if permitted, to let the prize go free again for less than its worth. For these reasons, and in accordance with the practice of ransom formerly so common on the land, it began to be, about the end of the 17th century, the custom to allow captors to liberate a captured vessel on an engagement to pay a certain ransom. The receipt for the ransom is of the nature of a passport or safe conduct, and contains a permission good against all cruisers of the belligerent or his ally, to pursue a certain voyage. Only in cases of necessity can the route and time laid down be departed from without violating the contract. The contract insures against molestation from other cruisers, but not against other kinds of hazard, and the ransom would still be binding, if nothing were said to the contrary, in case the vessel perished by the perils of the seas.

"As it is difficult to enforce the payment of ransom during war, the custom has prevailed, more or less, to deliver over to the captor hostages, who might be detained until the liquidation of the contract, and whose expenses were provided for in the ransom bill. The hostage being only collateral security, his death or flight cannot release from the contract. If the master or owners refuse to fulfil their stipulation, the hostage's remedy lies in an appeal to the courts of the captor's or owner's country.

"If a ransomed vessel is captured out of its course and condemned, the ransom is deducted from the proceeds of the vessel, and only the remainder goes to the second captor. If the captor's vessel is recaptured, with the ransom contract, or with the hostages, or with both on board, there is held to be a complete end to all claim for payment. If, on the other hand, the captor's vessel is taken after putting the ransom-bill and hostage in a place of safety, the contract continues unimpaired; nay, it is held so

Effect of capture.

\* U. S. Statutes, 1861, p. 257.

to continue if the captor's vessel is taken, and the securities for the payment of ransom are concealed, so as not to come into the actual possession of the second captor. And, again, when a captor's vessel was captured with the hostage and ransom-bill on board, in which there was an agreement that payment should be binding, notwithstanding such second capture, the English courts decided that the first captor being an alien, could not by their laws bring a suit for the recovery of a right acquired in actual war. But in this case the hostage might sue, or in case of his death, the captor after the end of the war.

The master's  
act binds the  
owners.

"The master of a vessel being an agent for the owners, they are bound by his act, when not fraudulent nor contrary to usage. But if the ransom should exceed the value of the ship and cargo, it is held that the owners by surrendering these may be free from obligation.

"A ransom contract is valid under the law of nations, although made in war, since it contemplates a state of war which it seeks to mitigate. Nevertheless, no nation is bound to allow its citizens to give or receive ransom-bills. By a French ordinance of 1756, privateers were forbidden to ransom a vessel until they had sent three prizes into port. The power of granting ransom has been taken away by Acts of Parliament from English cruisers, except in extreme cases, to be allowed by the courts of Admiralty. The reason alleged for this legislation is, that captors might abuse their power of ransoming vessels and injure neutral trade."\*

"In addition to what has been said, it may be added that ransom is forbidden by Sweden in a regulation of 1788, by Denmark in one of 1810, by Holland in an ordinance of 1781, by Russia apparently since 1787, and by Spain, so far as neutral vessels are concerned, since 1782. In France no neutral ship can be ransomed, nor can an enemy's vessel be ransomed without a certain authorization, and certain formalities. Our law permits ransom both of hostile and of neutral vessels, on the ground that in both cases it is a mere remission of the rights of the captors to what they take in war, so that every prohibition of it must expressly depend on the regulations of each particular country."†

"Foreign maritime tribunals rank arrangements for ransom

\* Woolsey, Sec. 142.

† *Ibid.* n. 14.

among *commencia belli*; hence they allow the captor to sue directly upon the bill if the ransom is not duly paid. The English courts refuse to except such arrangements from the effect of the rule that the character of an alien enemy carries with it a disability to sue, and compel payment of the debt indirectly, through an action brought by the imprisoned hostage for the recovery of his freedom.”\*

The Confederate cruisers, in the War of Secession, put many vessels belonging to citizens of the United States under ransom bonds; but, as payment of these bonds was conditional on the recognition of the independence of the Confederate States, no action was ever taken to make collection.

\* Hall, p. 392.



### PART III.

#### EMBARGO, REPRISALS AND RETORSION.

Sec. 1. Embargo. As means of obtaining redress for injuries, nations sometimes have recourse to measures partaking of a hostile character which are short of actual war. These measures are: *Embargo*, *Reprisals* and *Retorsion*.

An embargo is a "detention of vessels in a port, whether they be national or foreign, whether for the purpose of employing them and their crews in a naval expedition, as was formerly practiced, or for political purposes, or by way of reprisals."\*

"There are two kinds of embargoes; and although each is an act of hostility designed to weaken the commerce of the enemy, they have been distinguished by designating the one as warlike, as operating directly upon the vessels of the enemy; and the other as civil, as operating upon those of the citizens or subjects of the nation proclaiming the embargo."†

Sec. 2. Civil embargo.

A civil embargo may be laid by a government upon the vessels of its own citizens with other motives than hostility towards another nation; to restrict commerce in certain directions, to protect the vessels and their crews from the exactions of belligerents, or as "a simple act of internal security ordered to facilitate measures of police."‡

Great Britain, in 1766, in consequence of fears entertained of an impending famine, laid an embargo upon all grain-laden ships in her ports by an Order in Council, which was afterwards confirmed by Parliament.

Embargo of 1807.

"The embargo laid by Congress, in 1807, by the special recommendation of President Jefferson, was avowedly recommended as a measure of safety for our vessels, our seamen and our merchandise, from the then threatening dangers from the belligerents of Europe; and it was explicitly stated 'to be a measure called for by the occasion,' and 'neither hostile in its

\* Woolsey, Sec. 114.

† Upton, p. 164.

‡ Heffter, quoted by Lawrence, Wheaton, p. 511.

character, nor as justifying or inciting or leading to hostility with any nation whatever.' It was in no sense, then, a war measure."<sup>\*</sup>

Great Britain, the nation most seriously affected by the embargo of 1807, admitted that it afforded foreign nations no just cause of complaint. "And yet, in the half century since that event, uninterrupted intercourse has come to be regarded almost as an absolute right, and the injuries inflicted in such a way on friendly States would cause them to protest with energy or to retaliate."<sup>†</sup>

A hostile embargo is one laid by a nation upon the vessels of a foreign power in her ports, to enforce some demand for redress. If this measure is followed by a peaceable arrangement of the dispute between the nations, the vessels are restored to their owners, but if by war, they are regarded as lawful captures, and are condemned as prize of war. Sec. 3. Hostile embargo.

The practice of imposing hostile embargoes is sanctioned by international law, and, as said by Upton, "There is no doubt that embargo, as practiced in modern times, is sanctioned by the uniform usage of nations."<sup>‡</sup> But it is condemned on principle by many writers of the highest authority.

"This species of reprisals for some previous injury is laid down in the books as a lawful measure according to the usage of nations, but it is often reprobated, and cannot well be distinguished from the practice of seizing property found in the territory upon the declaration of war."<sup>§</sup> The practice condemned.

"Although such a measure might bring an adversary to terms, and prevent war, yet its resemblance to robbery, occurring as it does in the midst of peace, and its contrariety to the rules according to which the private property even of enemies is treated, ought to make it disgraceful and drive it into disuse."<sup>||</sup>

In accordance with the modern ideas of war, the practice of declaring embargoes has fallen completely into disuse at the present day. During the Crimean War, and in all the later wars in Europe, no belligerent imposed an embargo on the enemy's vessels, but, on the contrary, the greatest indulgences have been granted them in the completion of their cargoes, the time of sailing, and the prosecution of their voyages.<sup>¶</sup> Modern usage.

<sup>\*</sup> Story, Comm. on the Const., Sec. 1289.

<sup>†</sup> Woolsey, Sec. 114.

<sup>‡</sup> Upton, p. 92.

<sup>§</sup> Kent, Vol. I, p. 71.

<sup>||</sup> Woolsey, Sec. 114.

<sup>¶</sup> Comp. Sec. 50 "War," and Sec. 10 "Privateers."

Treaties of the  
United States.

The latest treaties made by the United States all contain articles forbidding embargoes between the contracting parties. "The citizens of neither of the contracting parties shall be liable in the States or territories of the other to any embargo, nor shall they be detained with their vessels, cargoes, merchandise, or effects, for any military expedition, nor for any public or private purpose whatsoever, without allowing to those interested a sufficient indemnification, previously agreed upon when possible."\*

In the United States the power to declare an embargo is conferred by the Constitution upon Congress alone.

Sec. 4. Reprisals.

"Reprisals are used between nation and nation in order to do justice to themselves, when they cannot otherwise obtain it. If a nation has taken possession of what belongs to another; if it refuses to pay a debt, to repair an injury, to make a just satisfaction, the other may seize what belongs to it, and apply it to its own advantage till it has obtained what is due for interest and damage, or keep it as a pledge until full satisfaction has been made. In the last case it is rather a stoppage or a seizure than reprisals; but they are frequently confounded in common language. The effects thus seized on are preserved while there is any hope of obtaining satisfaction or justice. As soon as that hope disappears they are confiscated, and then the reprisals are accomplished. If the two nations, upon this ground of quarrel, come to an open rupture, satisfaction is considered as refused from the moment that war is declared or hostilities commenced; and then also the effects seized may be confiscated."†

"*Reprisals* differ from *retorsion* in this, that the essence of the former consists in seizing the property of another nation by way of security, until it shall have listened to the just reclamations of the offended party, while *retorsion* includes all kind of measures which do an injury to another, similar and equivalent to that which we have experienced from him. Embargo, therefore, is a species of reprisals."‡

Negative and  
positive re-  
prisals.

"Reprisals are *negative* when a State refuses to fulfil a perfect obligation which it has contracted, or to permit another nation to enjoy a right which it claims. They are *positive*

\* U. S. Treaties, 1873; Italy, p. 504. See treaties U. S. generally.

† Vattel, p. 283.

‡ Woolsey, Sec. 114.

when they consist in seizing the persons and effects belonging to another nation, in order to obtain satisfaction.

"Reprisals are also either *general* or *special*. They are *general* when a State which has received, or supposes it has received, an injury from another nation, delivers commissions to its officers and subjects to take the persons and property belonging to the other nation wherever they may be found. It is, according to the present usage, the first step which is usually taken at the commencement of a public war, and may be considered as amounting to a declaration of hostilities, unless satisfaction is made by the offending State. *Special* reprisals are, where letters of marque are granted, in time of peace, to particular individuals who have suffered an injury from the government or citizens of another nation.

General and special reprisals.

"Reprisals are only to be granted in case of a clear and open denial of justice. The right of granting them is vested in the sovereign or supreme power of the State."\*

"Reprisals may be undertaken on account of any injury, but are chiefly confined to cases of refusal or even obstinate delay of justice."†

President Jackson, in his Message to Congress in December, 1834, said, in reference to certain claims against France: "It is a well settled principle of the international code, that where a nation owes another a liquidated debt, which it refuses or neglects to pay, the aggrieved party may seize on property belonging to the other, its citizens, or subjects, sufficient to pay the debt, without giving just cause of war. I recommend that a law be passed, authorizing reprisals upon French property, in case provision shall not be made for the payment of the debt at the approaching session of the French Chambers."‡

"Any of these acts of reprisal, or resort to forcible means of redress between nations, may assume the character of war in case adequate satisfaction is refused by the offending State."§

In several treaties concluded by the United States with South and Central American States, it is stipulated that no acts of reprisals shall be authorized unless satisfaction is refused or unreasonably delayed. The treaty of Guadalupe Hidalgo with

Treaty stipulations.

\* Lawrence's Wheaton, p. 506.

† Woolsey, Sec. 114.

‡ An. Register, 1834, p. 361.

§ Lawrence's Wheaton, p. 508.

Mexico, concluded in 1848, required disputes to be submitted to arbitration, on the proposal of either party, before any acts of reprisal or hostility of any kind should be resorted to, unless where such mode of procedure should be incompatible with the nature of the difference, or the circumstances of the case.\*

"He who makes reprisals against a nation on the property of its members indiscriminately, cannot be taxed with seizing the property of an innocent person for the debt of another; for, in this case, the sovereign is to compensate those of his subjects on whom the reprisals fall; it is a debt of the State or nation, of which each citizen ought only to pay his quota."†

Reprisals  
against a  
State.

"Where the property of the State is seized by way of reprisals, the proceeding needs no defence; on the other hand, to take the goods of private persons as security for the reparation of public wrongs is indefensible, except on the ground that a State and its subjects are so far one as to give it a claim on their property for public purposes, and that the injured State takes the place of the injurer, and exercises its power by the only means within its reach. As, therefore, when a man's land is taken for a public road, he has a claim for compensation, so when a man loses his property by the violent process of a foreign State against his own country, not he, but the whole society ought to make his loss good. Still reprisals are inhumane, and like seizure of private effects in land war, will, it is to be hoped, ere long entirely cease."‡

Power to grant  
letters of  
marque.

The power to grant letters of marque and reprisal is conferred upon Congress by the Constitution, and is exercised by the passage of an act to authorize the President to issue them.

This power has been exercised by Congress in the following instances:

The Act of July 9, 1798, authorized the issuance of special letters of marque and reprisal against French armed vessels. Orders to cruise against such vessels only were also given to the public vessels of the United States.§

The Act of February 6, 1802, authorized reprisals against the Bey of Tripoli and his subjects.||

\* U. S. Treaties, 1873, Mexico, p. 571. See also Bolivia, Brazil, &c.

† Vattel, p. 284.

‡ Woolsey, Sec. 114.

§ U. S. Statutes at Large, Vol. I, p. 578.

|| *Ibid.* Vol. II, p. 129.



The Act of June 18, 1812, declaring war to exist with Great Britain, authorized the issuance of letters of marque and general reprisal against the vessels, goods and effects of that government or its subjects.\*

The Act of March 3, 1815, gave to the President the same authority to issue letters of marque and reprisal against the Dey of Algiers, as was conferred in the case of Tripoli.†

During the Mexican War no reprisals were authorized in express terms by Congress, and no letters of marque were issued. Mexican property at sea was subject to capture by vessels-of-war, under the ordinary rules of war.‡

The Act of March 3, 1863, authorized the President to issue letters of marque and general reprisal in all domestic and foreign wars, but it was passed with reference to the War of Secession only, and was, by its own terms, limited to three years' duration.§

"Retorsion, or retaliation, is to apply the *lex talionis* to another nation—treating it or its subjects in similar circumstances according to the rule which it has set."||

Sec. 5. Retorsion.

"Retorsion is the appropriate answer to acts which it is within the strict right of a State to do, as being general acts of State organization, but which are evidence of unfriendliness, or which place the subjects of a foreign State under special disabilities as compared with other strangers, and result in injury to them. It consists in treating the subjects of the State giving provocation in an identical or closely analogous manner with that in which the State using retorsion are treated. Thus if the productions of a particular State are discouraged or kept out of a country by differential import duties, or if its subjects are put at a disadvantage as compared with other foreigners, the State affected may retaliate upon its neighbors by like laws and tariffs."¶

Of the nature of embargo is the so-called *droit d'angarie*, for which some writers have claimed the sanction of international law. This is the right, sometimes exercised by a belligerent, of detaining the vessels of a neutral and using them and their

Sec. 6. Droit d'angarie.

\* U. S. Statutes at Large, Vol. II, p. 755.

† *Ibid.* Vol. IX, p. 9.

‡ Woolsey, Sec. 114.

† *Ibid.* Vol. III, p. 230.

§ *Ibid.* 1862-5, p. 758.

¶ Hall, p. 308.



crews in military or naval expeditions. It is now considered justifiable only in cases of extreme necessity.

"It can only be excused, and perhaps scarcely justified by that clear and overwhelming necessity which would compel an individual to seize his neighbor's horse or weapon to defend his own life."\*

The same views of the practice are held by all modern writers of authority.†

Treaty stipulations.

One of the earliest treaties concluded by the United States, that with Prussia of 1785, declared in Article XVI that "the subjects or citizens of each of the contracting parties, their vessels and effects, shall not be liable to any embargo or detention on the part of the other, for any military expedition, or other public or private purpose whatsoever." This was modified in the treaty of 1799, continued in force by that of 1828, and the present stipulation is that the vessels of either power shall be detained and used only in cases of urgent necessity, and that the owners of the vessels so detained shall obtain full indemnity for their freight as well as for the loss occasioned by the delay.‡

This is the language generally used in treaties of the United States where any reference is made to the subject.

Under the rule which does not admit the plea of enforced service in bar of condemnation of a neutral vessel captured while employed in the military service of a belligerent, the practice of seizing neutral vessels to be employed as transports could not be defended as a right.

\* Phillimore, Vol. III, p. 42. † Hautefeuille, Vol. IV, p. 439, *et seq.*

‡ U. S. Treaties, 1873, Prussia, pp. 711, 720. See also Bolivia, Italy, &c.

## PART IV.

### BLOCKADE.

#### THE OBJECTS, ESTABLISHMENT, MANNER OF CONDUCTING AND PENALTIES FOR VIOLATION OF A LAWFUL BLOCKADE.

"The word blockade properly denotes obstructing the passage into or from a place on either element, but is more especially applied to naval forces preventing communication by water. With blockades by land, or ordinary sieges, neutrals have usually little to do."\* Sec. 1. Definition.

"Blockade is an incident of war, whether carried on between two nations, or by a legal government to suppress rebellion."†

The action of the French government in lately establishing a blockade over the Island of Formosa, and certain Chinese ports, as part of the hostile measures carried on against China, but without a formal declaration of war, may render an extension of this definition necessary. These measures have been submitted to without any protest by the other powers, and it would seem that the validity of a blockade established after open hostilities have occurred between two nations will be recognized even where war has not been declared and negotiations for a peaceful settlement are still in progress.

"There is no belligerent right more conclusively established in the law of nations, and certainly none more necessary or important in its application, than the right of blockade, as it has been defined, determined and practically executed in modern times. The right derives its origin from the highest and purest sources of maritime jurisprudence, is sanctioned by the practice of the most enlightened nations, and is justly regarded as one of the great bulwarks of a nation's security and independence."‡ Sec. 2. Origin of the right.

"Blockade is a belligerent right under the law of nations

\* Woolsey, Sec. 186.

† Dahlgren, p. 26.

‡ Upton, p. 275.

where war exists, and is as clearly defined as the belligerent right to levy contributions in the enemy's country. As the Supreme Court hold the latter to be constitutionally in the President, without an Act of Congress, as commander-in-chief of the army and navy, it follows necessarily that the power of blockade also resides in him; indeed, it would seem a clearer right, if possible, because as chief of the navy nobody can doubt the right of its commander to order a fleet or a ship to capture an enemy's vessel at sea, or to bombard a fortress on shore, and it is only another mode of assault and injury to the same enemy to shut up his harbors and close his trade by the same ship or fleet. The same weapons are used. The commander only varies the mode of attack."\*

Sec. 3. Notifica-  
tion.

"As a blockade is not a necessary consequence of a state of war, but has to be specially instituted, it would evidently be impossible to assume that a neutral possesses any knowledge of its existence until the fact of its establishment has been in some manner notified or brought home to him. So far not only is the general rule as a matter of fact agreed upon, but it could not stand otherwise. But opinions differ widely as to whether it is sufficient, in order to justify the belligerent in seizing the property of the neutral, that the knowledge of the latter shall be proved, or whether a formal notification must be served upon him.

"According to the view which finds its expression in English and North American practice, and which is adopted also by Prussia and Denmark, the source of liability to seizure is knowledge of the fact that a blockade has been established, together with the presumption that an existing blockade will under ordinary circumstances continue. A neutral, therefore, who sails for a port with full knowledge that it is blockaded at the moment when his voyage is commenced, ought to expect that it will be in the same state when he arrives; and anything which can be proved to affect him with knowledge at the former time will render him liable to the penalties imposed for violation of blockade.

"On the other hand, according to the view which is identified with French practice, and which is also followed by Italy, Spain, and Sweden, the neutral is not expected to shape his course on

\* Monthly Law Reporter, July, 1861, p. 151. The Tropic Wind.

any presumption with respect to the continuance or cessation of a blockade; and he is not injuriously affected by knowledge acquired at any time before he can experimentally test its existence as good on the spot which is subjected to it.

"Hence, although it has lately become customary for the French government at the commencement of a blockade to notify the fact of its existence to foreign governments as a matter of courtesy, their subjects are not considered to be affected by notice through them. Each neutral trader approaching the forbidden coast is individually warned by one of the blockading squadron, a vessel not engaged in the blockade being incompetent to affect the trader with notice, the fact of warning is endorsed on the ship's papers, with mention of date and place of notification, and it is only for subsequent attempts to enter that the neutral is liable to seizure.

"The theory accepted in England and the United States is the natural parent of a more elastic usage. Notification is a convenient mode of fixing a neutral with knowledge of the existence of a blockade, but it is not the necessary condition of his liability to seizure. In strictness, if a neutral vessel sail with the destination of a blockaded port from a place at which the fact of the blockade is so notorious that ignorance of its existence is impossible, confiscation may take place upon seizure without previous warning. But in practice notification of some sort is always given. If the blockade is instituted under the direct authority of the government, the fact of its commencement is notified to foreign States. The information thus communicated affects their subjects, who must be supposed to be put in possession of the knowledge which is afforded with the express object of its being communicated to them."\*

"It is absolutely necessary that the neutral should have had due notice of the blockade, in order to affect him with the penal consequences of a violation of it. This information may be communicated to him in two ways; either actually, by a formal notice from the blockading power; or constructively, by notice to his government, or by the notoriety of the fact. It is immaterial in what way the neutral comes to the knowledge of the blockade. If the blockade actually exists, and he has a

The neutral  
must have  
notice.

\* Hall, p. 611 *et seq.*

knowledge of it, he is bound not to violate it. A notice to a foreign government is a notice to all the individuals of that nation; and they are not permitted to aver ignorance of it, because it is the duty of the neutral government to communicate the notice to their people.”\*

Difference in  
practice.

“There is a difference in practice in regard to the amount of notification which neutrals may claim. The French hold, for the most part, that both a notice from the government of the belligerent, and a notice from a blockading vessel at or near the port, are necessary, so that a vessel will not incur guilt by coming to a port in order to ascertain whether a blockade, made known in the diplomatic way, is still kept up. The English authorities make two kinds of blockade, one a blockade *de facto*, which begins and ends with the fact, and which will involve no vessel attempting to enter a harbor in guilt, unless previously warned off; and the other a blockade by notification, accompanied by the fact. In the latter case, the presumption is that the blockade continues until notice to the contrary is given by the blockading government. Hence, ignorance of the existence of the blockade cannot ordinarily be plead as an excuse for visiting the blockaded port, but the voyage itself is evidence of an intention to do an unlawful act. This seems to be quite reasonable. Notice to the neutral State must be regarded as notice to all shippers who are its subjects, and if the rule of evidence presses hard in a few cases, the blockading government is not in fault. But the notice must be given to all neutral powers in order to reach their subjects; general notoriety, as by news travelling from one country to another, is not sufficient notice.”†

Necessity for  
formal noti-  
fication.

Professor Woolsey also notices the obligation of the belligerent to give formal notice to neutrals for their protection. “Justice to neutrals requires that their ships should not be subject to the risk and delays of a voyage to a port where they may be debarred admission.” The universal practice is, therefore, to communicate the news of a blockade to neutral governments, upon whom lies the responsibility of making it known to those who are engaged in commerce. And if such notice be given, similar notice must be given of the discontinuance of a blockade, as far as possible. For a wrong is done to

\* Kent, Vol. I, p. 154.

† Woolsey, Sec. 187.



neutrals if they are left to find out as they can that a blockade is terminated, since a long time may elapse before it will be considered safe to return to the old channel of commerce.\*

In the case of the *Neptunus*, principles were laid down by Sir Wm. Scott as to notification of blockade, and violation of blockade, that have been accepted fully by English and American Prize Courts, and writers on international law. In that case he said: "There are two sorts of blockade; one by the *simple fact* only, the other by notification accompanied with the fact. In the former case, when the fact ceases otherwise than by accident, or the shifting of the wind, there is immediately an end of the blockade; but where the fact is accompanied by a public notification from the government of a belligerent country to neutral governments, I apprehend, *primâ facie*, the blockade must be supposed to exist till it has been publicly repealed. It is the duty, undoubtedly, of a belligerent country, which has made the notification of blockade, to notify, in the same way, and immediately, the discontinuance of it; to suffer the fact to cease, and to apply the notification again at a distant time, would be a fraud on neutral nations, and a conduct which we are not to suppose that any country would pursue. I do not say that a blockade of this sort may not, in any case, expire *de facto*; but I say that such a conduct is not hastily to be presumed against any nation; and, therefore, till such a case is clearly made out, I shall hold that a blockade by notification is *primâ facie* to be presumed to continue till the notification is revoked."†

Case of the  
Neptunus.

"The effect of a notification to any foreign government would clearly be to include all the individuals of that nation; it would be nugatory if individuals were allowed to plead their ignorance of it; it is the duty of foreign governments to communicate the information to their subjects, whose interest they are bound to protect. I shall hold, therefore, that a neutral master can never be heard to aver against a notification of blockade that he is ignorant of it. If he is really ignorant of it, it may be the subject of representation to his own government, and may raise a claim for compensation from them, but it can be no plea in the

Effect of notification.

\* Woolsey, Sec. 187.

† Rob. Adm. Rep. Vol. I, p. 170. The Neptunus.



court of a belligerent. In the case of a blockade *de facto* only, it might be otherwise ; but this is a case of blockade by notification. Another distinction between a notified blockade and a blockade existing *de facto* only, is that in the former the act of sailing for a blockaded place is sufficient to constitute the offence. It is to be presumed that the notification will be formally revoked, and that due notice will be given of it ; till this is done the port is to be considered as closed up ; and from the moment of quitting port to sail on such a destination the offence of violating the blockade is complete, and the property engaged in it subject to confiscation. It may be different in a blockade existing *de facto* only ; there no presumption arises as to the continuance, and the ignorance of the party may be admitted as an excuse for sailing on a doubtful and provisional destination.”\*

Means of information open to the neutral.

“ It is obvious that, as all questions of international right presume good faith, a knowledge of the fact of a blockade, however acquired, will preclude a neutral master from any claim to receive a direct warning from the blockading squadron, even if the vessel should have sailed from the port where she had shipped her cargo without a knowledge of the blockade.”†

“ In addition to the official notification of a blockade to the government of the neutral, other sources of information are open to him ; and in some cases the inference of knowledge raised is so strong that he is not permitted to rebut it ; in others the presumption is not conclusive against him, but he is permitted to prove his ignorance, and the captor must judge from the circumstances of each case whether the neutral vessel acted in good faith and was really ignorant of the blockade, or whether the alleged ignorance was not assumed. Evidence of the notoriety would be the publication of the fact in the newspapers of the place of departure.”‡

Chief Justice Chase, referring to the rule that subjects a vessel to capture and condemnation for breach of blockade, when sailing from a neutral port, with the intention of entering a blockaded port with knowledge of the existence of the blockade, said, “ We are entirely satisfied with this rule. It was established with some hesitation, when sailing vessels were the

\* Rob. Adm. Rep. Vol. II, p. 110. The Neptunus.

† Twiss' Law of Nations, Sec. 104.

‡ Castle, p. 105.

only vehicles of ocean commerce; but now, when steam and electricity have made all nations neighbors, and blockade-running from neutral ports seems to have been organized as a business, and almost raised into a profession, it is clearly seen to be indispensable to the efficient exercise of belligerent rights."\*

"The practice of England and the United States is unquestionably better suited than that of France to the present conditions of navigation. The electric telegraph and newspapers spread authentic news rapidly and universally; and steam has reduced the length of voyages, and rendered their duration certain; it can only be under rare circumstances, against the effect of which mitigations such as those introduced into English usage may easily provide, that a vessel will arrive innocently before a blockaded port. If capture for attempt to break a blockade is to be permissible at all, it must be morally permissible to capture under ordinary circumstances without individual notice; and if such capture is morally permissible, it is certainly to the advantage of neutral States to allow it to take place. Belligerents will not quietly suffer the results of commerce prejudicial to their warlike operations; and unless they are entrusted with weapons of sufficient strength to enable them to deal with it effectively, they will try, with more or less success, to throw responsibility upon the neutral States, to the confusion of legal distinctions which it is highly convenient to the latter to maintain, and to the vastly increased danger of national conflicts."†

The doctrine held by French writers, and generally by Continental writers of authority, was stated by M. Rouher, in September, 1861, in a letter addressed to the French Chambers of Commerce. "The general usage," he says, "is, doubtless, for a government to inform other governments of the measures of blockade to which it has recourse; but this notification, which is not an absolute rule, is of no value by itself; it is only the announcing of an existing fact which would already produce its effects.

M. Rouher on  
notification.

"Another error of the claimants is to believe that the blockade does not exist until it is diplomatically notified, and that it does not apply to neutral vessels that have quitted their

\* The Circassian, Wallace's Rep. II, p. 151.

† Hall, p. 615.

country previously to the notification. A blockade is obligatory from the moment that it is effectively established; being the material result of a material fact, it commences with the real investment of the place, continues so long as that investment remains, and ceases with it.

"It is by erroneously attributing to the diplomatic notices of blockade a value and a signification which they do not have in themselves that it might be pretended to exclude neutrals from an entire territory, the access to which could not in reality be interdicted; and it is for the purpose of rendering these fictitious blockades entirely impossible that the agreement has been entered into not to consider a neutral as entitled to notice of the existence except at the blockaded places themselves."

The different views, as to the notification of blockade necessary, have been given at length, since, in the beginning of the War of Secession in 1861, the Government of the United States seemed inclined to adopt the French practice as to warning at the line of blockade in all cases.

Mr. Seward on  
notification.

The President's proclamation of blockade of April 19, 1861, stated in general terms that neutral vessels would be notified at each port under blockade. Mr. Seward informed Lord Lyons that the proclamation was "a mere notice of an intention to carry it into effect, and that the existence of the blockade will be made known in proper form by the blockading vessels. The practice of the United States was not to issue a notice of the blockade of each port, but to notify individually each vessel approaching the blockaded port, and to inscribe a memorandum of the notice having been given on the ship's papers. No vessel was liable to seizure which had not been individually warned. The fact of there being blockading ships present to give the warning was the best notice and best proof that the port was actually and effectually blockaded." Mr. Seward also said, in a letter to Mr. Adams, of June 8th, 1861, "The President's proclamation was a notice of an intention to blockade; and it was provided that ample warning should be given to vessels approaching and vessels seeking to leave the blockaded ports before capture should be allowed. The blockade, from the time it takes effect, is everywhere rendered actual and effective."

It is to be noted, however, that Commodore Pendergrast, com-

manding the squadron on the coasts of Virginia and North Carolina, in giving notice of the actual commencement of the blockade, on April 30, 1861, under the President's proclamation extending the blockade to those States, limited the warning to vessels at or near the line of blockade to vessels in ignorance of its existence. This construction of the President's proclamation was not disavowed by the Government.

Judge Grier, in deciding the question of the construction of the proclamation of blockade as to the notification to be given, in the case of the *Admiral*, on appeal from the decree of condemnation of the District Court of the United States for the Eastern District of Pennsylvania, said: "A vessel which has full knowledge of the existence of a blockade, before she enters upon her voyage, has no right to claim a warning or indorsement when taken in the act of attempting to enter."

Decisions of  
Courts of  
U. S.

"It would be an absurd construction of the President's proclamation, to require a notice to be given to those who already had knowledge. A notification is for those only who have sailed without a knowledge of the blockade, and get that first information from the blockading vessels."\*

Decisions to the same effect were rendered by other United States Courts in prize cases.

"After these decisions the practice became settled, and no complaint was made by neutral powers against this construction of the proclamation; and, under it, the law respecting notice of blockades was applied as heretofore in the English and American courts."†

It may be observed, however, that Courts of the United States in cases of capture for violation of the blockade of the Southern ports, admitted some relaxation of the strict ruling laid down, and held that a vessel with full knowledge of the blockade might clear and sail for a blockaded port, but with an alternative destination, where such intention was clearly shown on her papers and no attempt was made at evasion.

In the case of the *Empress*, captured for an attempt to break the blockade of the mouths of the Mississippi River, Judge Betts, of the District Court of the United States for the Southern District of New York, said: "The rule is also so far

Case of the Em-  
press.

\* Upton, p. 295.

† Dana's Wheaton, p. 682, n.

mitigated in its application that sailing purposely for a blockaded port, with the intention properly notified on the ship's papers, or otherwise fairly disclosed, may be excused in a neutral ship, if the object is honestly to inquire elsewhere whether the blockade is still in continuance; and if so, to avoid the blockaded port and complete the voyage at a lawful one. The hazard of allowing such privilege, and the necessity of observing the utmost ingenuousness in its indulgence, are emphatically noted in the authorities; and, accordingly, the courts take heed in administering it that the neutral be not permitted, under cover of that relaxation of prize law, to smother the principle by placing himself out of reach of its restraints. An adherence to the old rule would, therefore, seem still to be exacted in its full simplicity in one of its cardinal features, which is, that the neutral vessel shall make inquiries so plainly clear of the blockaded port that she shall not acquire the ability (as Chancellor Kent phrases the act) *to slip herself into it*. Phillimore states the general result of the authorities to be 'that it has never, under any circumstances, been held legal that the inquiry shall be made at the mouth of the river or estuary' of the blockaded port.

"It is clear, therefore, to the court that the claimants cannot lawfully, under claim of making inquiry whether a port known to have been under blockade when the voyage was set on foot, and after the vessel had been prosecuting it towards the port, is still under blockade, go forward to entrance of the port and within the actual line of the blockading force; and that such act, according to the law of nations, subjects the vessel to condemnation as prize of war."\*

The vessel and cargo were condemned for breach of blockade, but the decree of condemnation was set aside by the Circuit Court, on the ground that the blockade of the port of New Orleans had not been officially notified to British and Brazilian authorities, and that the blockade of that port was, as far as concerned the *Empress*, a blockade *de facto* only, and no guilt attached to the vessel in sailing directly from Rio Janeiro for New Orleans, and making her inquiries at the line of blockade.

Justice requires that the neutral vessels must have an opportunity of learning of the existence of a blockade, and hence,

Special warning  
at the line of  
blockade.

\* Blatchford, Prize Cases, p. 178. The *Empress*.



vessels at sea when the notification is received at the ports of departure, are not liable to any penalty for attempting to enter a blockaded port, unless it can be shown that they could have obtained a knowledge of it during the voyage. This case is provided for in many treaties, and special warning at the line of blockade is required.\* The principle, however, is so well established as to no longer need any treaty guarantees.

The United States have also, at different times, concluded treaties in which it is stipulated that, under some circumstances, a vessel may sail with a full knowledge of the blockade, and not be liable for a first attempt to enter a blockaded port. Several such treaties are still in force, while others are obsolete from countries entering into them having been merged into other nationalities. They are: with Greece, 1837; Prussia, 1828; Sweden and Norway, 1827; Sardinia, 1838; the Two Sicilies, 1855. The language of all these treaties is identical: "Considering the remoteness of the respective countries of the two high contracting parties and the uncertainty resulting therefrom, with respect to the various events which may take place, it is agreed that a merchant vessel belonging to either of them, which may be bound to a port supposed at the time of its departure to be blockaded, shall not, however, be captured or condemned for having attempted a first time to enter said port, unless it can be proved that the said vessel could and ought to have learned during its voyage that the blockade of the place in question still continued. But all vessels which, after having been warned off once, shall during the same voyage attempt a second time to enter the same blockaded port, during the continuance of said blockade, shall then subject themselves to be detained and condemned."†

Treaty stipulations.

The special warning and endorsement on the ship's papers may be made by any officer commanding a vessel of the blockading squadron. The endorsement usually gives the name of the blockading vessel, and the latitude and longitude of the place, with the date.

The proper notification having been given by an officer of the blockading force, the neutral master "is bound to manifest

\* U. S. Treaties, 1873. Great Britain, p. 328. Brazil, Bolivia, etc.

† U. S. Treaties, 1873. Greece, p. 435.



by his immediate acts his determination to obey the warning he has received. A very short delay, an interval of probably less than an hour, will enable the belligerent to determine whether the master is pursuing the course he is bound to observe, or whether the temporary detention may not lawfully be followed by a final capture.”\*

Sec. 5. Vessels  
in port at com-  
mencement of  
blockade.

“With respect to violating a blockade by coming out with a cargo, the time of shipment is very material; for although it might be hard to refuse a neutral liberty to retire with a cargo already laden, and by that act already become neutral property, yet after the commencement of a blockade, a neutral cannot be allowed to interpose, in any way, to assist the exportation of the property of the enemy. A neutral ship departing can only take away a cargo *bonâ fide* purchased and delivered before the commencement of the blockade; if she afterwards take on board a cargo, it is a violation of the blockade. But where a ship was transferred from one neutral merchant to another in a blockaded port, and sailed out in ballast, she was determined not to have violated the blockade. So where goods were sent into the blockaded port before the commencement of the blockade, but reshipped by order of the neutral proprietor, as found unsalable during the blockade, they were held entitled to restitution. For the same rule which permits neutrals to withdraw their vessels from a blockaded port extends also, with equal justice, to merchandise sent in before the blockade and withdrawn *bonâ fide* by the neutral proprietor.

“After the commencement of a blockade, a neutral is no longer at liberty to make any purchase in that port.”†

Hautefeuille, inclined generally to favor the neutral, says: “The neutral vessel, which has entered a port before the blockade, can always leave in ballast, or carrying away the goods shipped before the notice. But it cannot, without being guilty of a violation of the law imposed by the conqueror, take on board merchandise after the commencement of the blockade, even although it was purchased before.”‡ He quotes some French treaties as permitting vessels to sail with their cargoes, without regard to the time of shipment.

Several treaties made by the United States contain stipula-

\* Halleck, Chap. CXXXIII, Sec. 30.

† Lawrence's Wheaton, p. 842.

‡ Hautefeuille, Vol. II, p. 216.

tions that vessels in port at the commencement of a blockade shall be free to sail with their cargoes, but are silent as to time of shipment.\* In the absence of treaty agreements on this point, the United States Prize Courts follow the general law of nations, which prohibits taking on board any cargo after the actual commencement of the blockade.

In the treaty with Italy of 1871 it is stipulated that vessels leaving a blockaded port with cargo shipped after the commencement of the blockade shall be warned to return and discharge such cargo. If, after warning, they persist in sailing with the illegal cargo, they may then be captured and condemned.†

In the case of the *Hiawatha*, captured May 20, 1861, while endeavoring to evade the blockade of the James River, Judge Betts held that "The act of egress is as culpable as the act of ingress, when done in fraud of the blockade. On notice that the port of Richmond was under blockade, the *Hiawatha*, being a neutral vessel, had a right to withdraw, with all the cargo then honestly laden on board, but she could not have a right to add to her cargo after notification or knowledge of the blockade. No cargo was laden on the vessel here until the afternoon of the 11th of May, subsequent to the effort of Lord Lyons to obtain from Mr. Seward a relaxation of the limitation of the time of departure with respect to the *Hiawatha*. That was a point within the scope of diplomatic arrangement, but the accommodation sought for this vessel, both as to her lading and time of departure, in the letter of Lord Lyons to Mr. Seward, of the 9th of May, and the reply thereto, make no mention of a privilege granted her by this Government to ship cargo after she received notice of the blockade, and the privilege solicited does not seem to have been accorded by Mr. Seward; and, accordingly, the vessel, if she had taken her departure within the period of fifteen days from the establishment of the blockade, would not have been entitled to export the cargo taken on board after knowledge of the blockade, without clear proof that the act was honest and fair as to the belligerent rights of the captors.

Case of the *Hiawatha*.

"Upon the proofs, the vessel herself did not commence her

\* U. S. Treaties, 1873. Bolivia, Ecuador, Hayti, etc.

† U. S. Treaties, p. 507.

outward voyage until the 16th of May, if unloosing her fasts in port be deemed the commencement of the voyage, and she is, accordingly, outside of the fifteen days' term of indulgence. When captured she had left the port of Richmond and violated the blockade there existing.

"I accordingly pronounce for the condemnation of the vessel and cargo, because of a violation of the blockade in question."\*

This judgment was affirmed, on appeal, by the Supreme Court of the United States.

Time allowed to  
leave port.

It is customary to allow a reasonable time from the actual commencement of a blockade, during which neutral vessels in the blockaded ports may sail without any liability. This is only just, as the condition of a vessel may, and often will, prevent departure immediately on receiving notice of the establishment of a blockade. In the case of a vessel under repairs, the time would probably always be extended, as might be necessary, if it were shown that due diligence was displayed in preparing the vessel for sea.

During the Mexican War, by direction of the Secretary of the Navy, twenty days were allowed neutral vessels to clear from ports under blockade; and Mr. Seward, in May, 1861, informed Lord Lyons that "Neutral vessels will be allowed fifteen days to leave port after the actual commencement of the blockade, whether such vessels are with or without cargoes, and whether such cargoes were shipped before or after the commencement of the blockade."†

In view of the decision in the case of the *Hiawatha*, however, Mr. Seward found it necessary to write to the British Minister on the 16th of October, 1861, that "the Judge of the Court of the United States for the Southern District of New York having recently decided, after elaborate argument of counsel, that the law of blockade does not permit a vessel, in a blockaded port, to take on board cargo after the commencement of the blockade, with a view to avoid any future misunderstanding upon this subject, you are informed that the law, as thus interpreted by the judge, will be expected to be strictly

\* Blatchford Prize Cases. The *Hiawatha*, p. 19, *et seq.*

† Owing to the low stage of water at the mouth of the Mississippi river when the blockade was established, the time for leaving port was extended somewhat in favor of heavy vessels then at New Orleans.

observed by all vessels in ports of the insurgent States during their blockade by the naval forces of the United States.”\*

Neutral vessels found in an enemy's port on its reduction, and which entered previously to the commencement of the investment or blockade, are not liable to confiscation.

Mr. Wheaton says of the objects for which a blockade is established: “One of the most important of the belligerent rights is that of blockading the enemy's ports, not merely to compel the surrender of the place actually attacked or besieged, but as a means, often the most effectual, of compelling the enemy, by the pressure upon his financial resources, to listen to reasonable propositions of peace. At the same time it cannot be fairly denied that the exercise of this incontestable right, where it is applied to all the ports of an enemy's country, so as entirely to cut off his commercial intercourse by sea with other countries, if the measure be continued for an indefinite length of time, must give rise to considerable uneasiness on the part of those powers whose accustomed trade will be thus seriously affected by it.”†

Sec. 6. Objects of blockade.

“Commercial ports may, in time of war, through neutral trade, become efficacious allies to a belligerent power having the control or use of them. So far as that aid avails the enemy, it is warlike in its nature, and may be repelled by war means. Blockade is the measure recognized by the law of nations as the appropriate remedy, and that is, in character and operation, peaceful as to neutrals, and only warlike in respect to the enemy against whom it is imposed. The President, as Commander-in-Chief of the army and navy, is the functionary under our government who has, as incident to his office, the power and right to exercise the resisting and repelling means of legitimate warfare whenever the exigencies of the case require them. And it is not to be overlooked, that in selecting the method of restraining the commerce of neutrals with a besieged or beleaguered port, the milder means of blockade is more favorable to them than a peremptory exclusion of their trade by closing the port absolutely.

“It certainly can be of no consequence whether the ports blockaded belonged technically or in reality to the United

\* President's Mess. and Docs., 1861-2, p. 173.

† Lawrence's Wheaton, p. 821, *n.*

States, or were the property of individuals innocent of any warlike purposes against the United States, or of aiding its enemies. It is sufficient if the evidence shows the ports to be under the power and use of the enemies of the United States. This use may be an usurped one, and in wrong of the actual proprietary authority of the places. The right of the United States to prevent such use being turned to their prejudice, rests not at all upon the character of the true ownership and rightful authority over the places, but on that of their employment by the occupants. Whilst so held by an enemy, they become foreign territory.”\*

Sec. 7. Extent  
of blockade.

By a treaty concluded between Sweden and the United Provinces in 1667, lawful blockade was defined to be, “of fortresses, towns, or places having military garrisons, only while they are besieged or attacked by an armed force with the intention of reducing them, and in regard to places on the coast, the investment must be both by land and sea.”

One of the causes alleged by Napoleon I. for his Berlin Decree of November 21, 1806, was that England had “extended the right of blockade to unfortified cities and ports, to harbors and the mouths of rivers, while this right, according to reason and the usage of civilized nations, is only applicable to fortified places.”

Mr. Cass, in certain instructions to United States Ministers abroad in 1859, intimated that the United States would be inclined to regard lawful blockade as confined simply to places against which military operations were directed; but although nearly all commercial treaties concluded by the United States define effective blockade, they contain no recognition of such a limit to its operations.

In reference to the operations of a blockade, Mr. Cass said: “The blockade of a coast or of commercial positions along it, without any regard to ulterior military operations, and with the real design of carrying on a war against trade, and from its very nature against the trade of peaceful and friendly powers, instead of a war against armed men, is a proceeding which it is difficult to reconcile with reason or with the opinions of modern times. To watch every creek and river and harbor upon an ocean

\* Blatchford, Prize Cases, p. 10. The Hiawatha.



frontier in order to seize and confiscate every vessel, with its cargo, attempting to enter or go out, without any direct effect upon the true objects of war, is a mode of conducting hostilities which would find few advocates if now first presented for consideration."\*

Whatever opinion may have been held on this point by our State Department in discussions of neutral rights, it is certain that no such limitation of the right of blockade was for a moment entertained when the United States assumed the position of belligerents in 1861. Mr. Seward in April, 1861, referring to the proclamation of the blockade of the Southern ports, stated that it was the intention of the government to blockade the entire coast from Chesapeake Bay to the mouth of the Rio Grande. This intention was rigorously carried into effect, and every harbor, inlet and river was placed under close blockade, as were also many portions of the open coast where a landing would have been practicable.

Mr. Cass's opinion not acted upon, in war of secession.

"By the law of nations, as now recognized, a belligerent has a right to invest the ports of his enemy by sea as well as he has to lay siege to his towns by land; and not only in the case of naval stations or military ports, but also in the case of purely commercial ports, instituted for the purpose of merely closing them against trade, and not with any hope or intention of actually reducing or capturing them."†

"A blockade is not confined to a seaport, but may have effect on a roadstead, or a portion of a coast, or the mouth of a river. But if the river is a pathway to interior neutral territories, the passage on the stream of vessels destined for neutral soil cannot be impeded."‡

"A blockade cannot extend to the mouth of a river flowing through several neutral States, nor to a strait whose shores belong to different nations."§

Limit of blockade.

"Where an extensive line of coast is to be blockaded, the force employed must be sufficiently large to operate on the whole line at the same time. A belligerent cannot be allowed to proclaim that he has instituted a blockade of several ports of the enemy when in truth he has only blockaded one. Accord-

\* President's Mess., 1859-60, p. 31, Mr. Cass to Mr. Mason.

† Castle, p. 95.

‡ Woolsey, Sec. 186.

§ Hautefeuille, Vol. II, p. 208.

ingly, a neutral is at liberty to disregard such notice, and is not liable for a breach of blockade for afterwards attempting to enter the port which is really blockaded."\*

Sec. 8. Effective blockade.

The declaration of the Paris Conference of 1856, that "blockades to be obligatory are to be effective, that is to say, maintained by a sufficient force to shut out the access of the enemy's ships and other vessels in reality," is now a recognized principle of international law. The United States, although declining, for reasons that will be stated hereafter, to accept that declaration in its entirety, had previously adopted in effect its definition of effective blockade in several treaties of commerce and navigation.† As early as 1828 a treaty concluded between the United States and Brazil declares that "only those places are besieged or blockaded which are actually attacked by a force capable of preventing the entry of the neutral."‡

By Article XIII of the treaty with Italy of 1871 it is "expressly declared that such places only shall be considered blockaded as shall be actually invested by naval forces capable of preventing the entry of neutrals, and so stationed as to create an evident danger on their part to attempt it."§ This definition is more in accordance with prevailing opinion than the declaration of Paris.

Instructions of U. S. Navy Department.

The following instructions were given by the Navy Department to the flag-officer commanding the United States naval forces in the Pacific in 1846: "A lawful maritime blockade requires the actual presence of a sufficient force situated at the entrance of the ports, sufficiently near to prevent communication. The United States have at all times maintained these principles on the subject of blockade, and you will take care not to attempt the application of penalties for a breach of blockade except in cases where your right is justified by these rules. You should give public notice that, under Commodore Stockton's general notification, no port on the west coast of Mexico is regarded as blockaded unless there is a sufficient American force to maintain it actually present, or temporarily driven from such actual presence by stress of weather, intending to return."||

\* Lawrence's *Wheaton*, p. 835, *n.*

† See "Privateering."

‡ U. S. *Treaties*, 1873. Brazil, p. 99; also Ecuador, Mexico, New Granada, etc.

§ *Ibid.* Italy, p. 507.

|| Mr. Mason, Dec. 24, 1846.

The fact that a few vessels may under favorable circumstances evade the blockading vessels will not render the blockade liable to be considered ineffective. Lord Russell in a despatch to the British Minister at Washington of February 15, 1862, said: "Her Majesty's Government are of the opinion that, assuming that the blockade is duly notified, and also that a number of ships are stationed and remain at the entrance of a port, sufficient really to prevent access to it or to create an evident danger of entering or leaving it, and that these ships do not voluntarily permit ingress or egress, the fact that various ships may have successfully escaped through it will not of itself prevent the blockade from being an effective one by international law."\* Lord Russell stated to Parliament that this despatch was written after obtaining an opinion from the law officers of the Crown.

M. Rouher, in a letter to the French Chambers of Commerce in September, 1861, said on this point: "The effectiveness of the blockade is to-day, for all the world, the essential condition of its validity. But as soon as there are at the places to which a belligerent wishes to interdict access, forces sufficient to prevent their being approached without exposure to a certain danger, the neutral is compelled, no matter how prejudicial to him it may be, to respect the blockade."†

The force necessary to maintain an effective blockade cannot be determined with exactness, although several treaties between European powers have fixed a minimum of the force required to establish a lawful blockade.

A treaty between France and Denmark, concluded in 1742, required that the entrance of a port to be blockaded should be closed by at least two vessels, or by a battery on shore in such position that vessels could not get in without manifest danger. A treaty of 1753, between Holland and the Two Sicilies, required the presence of at least six ships, at the distance of "a little more than gun-shot from the port," or batteries on shore so placed that an entrance could not be made without passing under the besiegers' guns. In 1818 a treaty between Russia and Denmark was concluded containing the same stipulations as that between France and Denmark, cited above.

Some treaty provisions.

Such stipulations are no longer found in treaties, and it does

\* Lawrence's Wheaton, p. 832, *n*.

† *Ibid.* p. 833, *n*.

not appear that blockades were ever established in accordance with them.

Blockade of  
Charleston.

"At Charleston a certain number of vessels would contrive to slip in, and a position was effected in the inner roads by the iron-clads and the advance pushed well up to the forts at the entrance; this checked the neutral operations until vessels could be built especially adapted to the peculiarities of the entrance, vessels drawing about six to seven feet and very fast, so as to pass over the shoals on either hand where none of our vessels could float. Taking a good night, they risked the fire of the outer line and ran over the shoals inside. This was met by large detachments of boats with howitzers, which lay close up to the entrance, so that even of this new style of steamers many were run aground and destroyed by our fire. There were twenty other ports of my command, stretching over three hundred miles, which there was no difficulty in closing perfectly by a small force."\*

To maintain the blockade of that portion of the coast referred to by Rear-Admiral Dahlgren in the above extract, there were detailed by the Navy Department, when he assumed command in July, 1863, about ninety vessels of all classes. At the single port of Charleston there were stationed in July of that year, before the iron-clads crossed the bar, twenty-three vessels, occupying a line of over ten miles in extent.

English and  
American  
doctrine.

"The doctrine with regard to the proper maintenance of a blockade, which has been laid down by the English and American courts, which is approved of by English and American writers, and which is embodied in the policy of both countries, requires that a place shall be 'watched by a force sufficient to render the egress or ingress dangerous; or, in other words, save under peculiar circumstances, as fogs, violent winds, and some necessary absences, sufficient to render the capture of vessels attempting to go in or come out most probable.'

"Provided that access is in fact interdicted, the distance at which the blockading force may be stationed from the closed port is immaterial. Thus Buenos Ayres has been considered to be effectually blockaded by vessels stationed in the neighborhood of Monte Video; and during the Russian war in 1854, the

\* Dahlgren, p. 46.

blockade of Riga was maintained at a distance of one hundred and twenty miles from the town by a ship in the Lyser Ort, a channel three miles wide, which forms the only navigable entrance to the gulf.

"It is impossible to fix with any accuracy the amount of danger in entry which is necessary to preserve the validity of a blockade. It is for the Prize Courts of the belligerent to decide whether in a given instance a vessel captured for its breach had reason to suppose it to be non-existent, or for the neutral government to examine, on the particular facts, whether it is proper to withhold or to withdraw recognition. In some cases, where a blockading squadron, from the nature of the channels leading to a port, can be eluded with ease, a larger number of successful evasions may be insufficient to destroy the legal efficiency of the blockade.

"This abstention from any pedantic interpretation of general rules extends to cases where, the force being adequate and the fact of blockade known, a ship enters owing to a momentary absence of a blockading vessel, not only when, as already mentioned, the absence is owing to weather, but even when it is caused by the chase of a prize. The blockade is not in these cases raised, and an endeavor to take advantage of such absence is looked upon as an attempted breach."\*

The efficiency of a blockade is not made to depend only on the vessels stationed actually off the port blockaded. Any public vessel of the belligerent may make captures of ships that have escaped through the line of blockade, or are found at sea bound for a blockaded port with full knowledge of its existence.

"The point taken by the claimants, that the capture in this case is invalid because not made by a vessel actually stationed at the blockaded port, is not supported by any authority produced, nor does it comport with any reason upholding the authority of a belligerent to repress infractions of a blockade. The guilty vessel does not purge her offence by a successful act of fraud or deceit in preventing an arrest by the force supporting the blockade. Her capture is lawful, although the blockading force may be entirely absent from its post when the culpable act is committed. Any public vessel of the belligerent

Any public vessel may make captures.

\* Hall, p. 617.



whose rights are violated may be the agent or minister to apprehend the offender, though, by dexterity or superior speed, the culpable actor may escape arrest at the time or place of the perpetration of the wrong. The only question which seems to be allowed in that respect is, whether the capturing vessel possessed the attributes of a national ship, so as to be entitled to participate in prize proceeds. Yet, aside from any right to a participation in the prize proceeds, the power to capture an enemy vessel by any national force at sea seems irrefragable, whether the liability of the vessel attached arises from her positive hostile character, or from her violation of the belligerent rights of the captor.

"A vessel guilty of an unlawful trade with the enemy is liable to capture for the offence at any time during the voyage in which the offence is committed."\*

Sec. 9. How a blockade is raised and re-established.

A blockade is raised when the vessels maintaining it are withdrawn by the government that instituted it, or when they are driven off by a superior force of the enemy. In either case, the re-establishment of the blockade requires the same notice to neutrals as was originally given, before the penalty for violation of the blockade can be inflicted on neutral vessels sailing for a blockaded port; but the blockade *de facto* may be instituted at any time. The claim that a blockade has been raised by the enemy's forces will not be admitted, unless it is shown, beyond question, that all the blockading vessels have been driven from their stations off the port.

Charleston, S. C., 1863.

When the Confederate steamers Chocura and Palmetto State came out of Charleston harbor on the morning of January 31, 1863, and engaged the blockading squadron, as they compelled the surrender of one vessel and disabled others, it was claimed by the Confederate General commanding in Charleston that the blockade was raised and the port was open to the commerce of the world. The invalidity of the claim made was manifest from the fact that many of the blockading vessels did not even leave their anchorages; and it had no effect whatever on the operations of the blockade. Had it been absolutely a fact that every vessel on the blockade of Charleston was driven off, the port would have been open to commerce only during their

\* Blatchford, Prize Cases, p. 261-2. The Memphis.

absence. The presence of a sufficient force would have again closed the port, the only difference being that neutral vessels sailing for Charleston between the 31st of January and the receipt by their governments of the new notification, would not have been liable to capture for a first attempt to enter.

"A blockade is not considered raised, where the communication may be left open by the ships of the squadron being employed in chase of suspicious vessels who had approached the blockaded port. But where the ships of the blockading squadron are removed, and an inadequate force left behind, it was held that the blockade must be considered to be raised.

"In the American courts it has been held, that the accidental dispersion of a blockading squadron does not raise the blockade where the *animus revertendi* is preserved; but that the withdrawal of the blockading squadron for other hostile purpose, however temporary, does."\* Accidental dispersion of vessels.

"The blockade ceases if an enemy's force succeeds, for however short a time, in driving off the squadron which is charged with maintaining it, or if the vessels are diverted to other employment; and if a prize is pursued so far from the blockading station that a neutral ship on arriving near the entrance may fairly think that the blockade is abandoned, it may be held to be at least so far impaired that the neutral so attempting to enter is relieved from the natural penalty of his act."†

"The Niagara, blockading Charleston, had been sent away to intercept a cargo of arms expected at another part of the coast, and the harbor remained open for at least five days. Lord Lyons took it for granted that an interruption had occurred, but the Government of the United States, in view of the effect understood by it to flow from a general notification, refused to admit that any cessation had taken place."‡

The Supreme Court of the United States decided in the case of the *Circassian* that "The occupation of a city by a blockading belligerent does not terminate a public blockade of it previously existing; the city being itself hostile, the opposing enemy in the neighborhood, and the occupation limited, recent, and subject to the vicissitudes of war."§

\* Castle, pp. 100-1.

† *Ibid.* p. 619, n.

‡ Hall, p. 618.

§ Wallace's Rep., Vol. II, p. 135.

"Common fame in regard to the breaking up of a blockade will justify a neutral in sailing for the blockaded port, although, as we have seen, it is not sufficient notice to him; he ought to have more evidence of an interference with the normal state of things than he needs to have of a return to it."\*

Notice of discontinuance.

"It is no doubt the duty of a belligerent State which has formally notified the commencement of a blockade, to give equal and immediate publicity to its discontinuance; but a vessel bound for, or approaching a port at a time between the actual cessation of blockade and the public notification of the fact, is not liable to confiscation. If a ship is captured under such circumstances, the utmost, but also the legitimate, effect of a notification is that the neutral who has probably started with the intention of violating the blockade, and whose adventure has since become innocent from events with which he has had nothing to do, is bound to prove the existence of a state of facts which frees his property from the penalty to which it is *prima facie* exposed. The presumption of the court will be that a regularly notified blockade continues to exist, until that presumption is displaced by evidence. In the case of a *de facto* blockade, the burden of proof lies always upon the captor."†

Sec. 10. The duty of neutrals respecting blockades.

As it is the plain duty of neutral governments to render no assistance to either belligerent, so it is equally the duty of the neutral subject to respect a blockade lawfully established, since, as we have seen, a blockade is an active operation of war.

"The object of a blockade being that all foreign connection and correspondence with the blockaded port is to be entirely cut off, a neutral, who by any act attempts to put himself in connection and correspondence with such a port, is guilty of the unneutral act of violating a blockade."‡

The following propositions received the assent of a majority of the Supreme Court of the United States in 1861:

"Neutrals have a right to challenge the existence of a blockade *de facto* and also the authority of the party instituting it. They have a right to enter the ports of a friendly nation for the purposes of commerce, but are bound to recognize the right of a belligerent engaged in actual war, to use this mode of coercion for subduing the enemy.

\* Woolsey, Sec. 187.

† Hall, p. 618.

‡ Castle, p. 107.

"To legitimate the capture of a neutral vessel or property on the high seas, a *war* must exist *de facto*, and the neutral must have a knowledge or notice of the intention of one of the belligerents to use this mode of coercion against a port, city or territory in possession of the other.

"War is that state in which a nation prosecutes its right by force; and it is not necessary that both parties should be acknowledged as independent or sovereign States, nor that war should be solemnly declared.

"Where the sovereign of a neutral State has acknowledged the existence of a war by his proclamation of neutrality, a citizen of that State is estopped from denying the existence of the war and the belligerent right of blockade."\*

The neutral governments, on receipt of notification of a regularly established blockade, publish the information for the protection of their subjects, and at the same time warn them that any act in violation of the blockade will be done at their peril.

Vattel says: "All commerce with a besieged town is absolutely prohibited. If I lay siege to a place, or even *simply blockade* it, I have a right to hinder any one from entering, and to treat as an enemy whoever attempts to enter the place or carry anything to the besieged, without my leave; for he opposes my undertaking, and may contribute to the miscarriage of it, and thus involve me in all the misfortunes of an unsuccessful war."†

Sec. 11. Why breach of blockade is unlawful.

"There is a general agreement that it is unlawful for a neutral vessel knowingly to attempt to break a blockade, whether by issuing from or entering the blockaded place. Such an act, especially of ingress, tends to aid one of the belligerents in the most direct manner against the designs of the other, and is therefore a great departure from the line of neutrality. And a similar act on land would involve the loss of the most innocent articles intended for a besieged town. M. Ortolan places the obligation to respect a blockade on the ground that there is an actual substitution of sovereignty, that is, that one belligerent has possession by occupancy of the waters of the other. But this is a formal way of defending the right of blockade, and may be found fault with, perhaps, for the reason that sovereignty

Ortolan's views,

\* Lawrence's Wheaton, Suppl. p. 13.

† Vattel, p. 329.

over water along a coast is merely an incident to sovereignty on the adjoining land, which the blockader has not yet acquired. The true ground of the right is simply this, that the belligerent has a right to carry on a siege, and that his act of commencing such a siege places neutrals under an obligation not to interfere with his plans. If the sea were a common pathway to the very coast, this right would still subsist.”\*

Hautefeuille on  
the right of  
blockade.

Hautefeuille holds the same views as Ortolan, as to the origin of the right of excluding neutrals from blockaded ports, and, as a consequence, would limit breach of blockade to the actual passage of a vessel over the conquered territorial waters.† Ortolan does not absolutely claim this limit for the operations of a blockade, but admits that France, as well as other nations, has considered sailing for a blockaded port with knowledge of the blockade a sufficient ground for capture and condemnation.

Another consequence of the position assumed by these writers is, that any absence of the blockading squadron, however occasioned, causes a cessation of the blockade. This, as has been shown, is not recognized as the law on the subject.

Sec. 12. What is  
breach of  
blockade.

“Although the law of nations does not admit of the condemnation of a neutral vessel for the mere intention to enter a blockaded port unconnected with any fact, yet the English and American Courts have decided ‘that the fact of sailing for a blockaded port, knowing it to be blockaded, is an attempt to enter such port, and, therefore, from the very commencement of its voyage, the vessel is *in delicto*, and liable to be punished.’”‡

And General Halleck says: “An actual entrance into a blockaded port is by no means necessary to render a neutral ship guilty of a violation of the blockade. It is the attempt to commit the offence which, in the judgment of the law, constitutes the crime. If the vessel knows of the blockade before she begins her voyage, the offence is complete the moment she quits her port of departure. If that knowledge is communicated to her during the voyage, its continued prosecution involves the crime and justifies the penalty. If it is not given to her till she reaches the blockading squadron, she must immediately retire, or she is made liable to confiscation.”§

\* Woolsey, Sec. 186.

† Castle, p. 107.

‡ Hautefeuille, Vol. III, p. 120.

§ Castle, p. 107.



Professor Woolsey says, in regard to breach of blockade :  
 " A vessel violates the law of blockade by some positive act of entering or quitting, or by showing a clear and speedy intention to enter a blockaded port. A remote intention entertained at the outset of the voyage, for instance, might be abandoned, and the seizure of such a vessel on the high seas would be unlawful. It must be at or near the harbor to be liable to penalty."\*

If this were accepted as the law of nations on the subject, the question would arise, at what period of the voyage must the intention to violate the blockade be abandoned, and how must such change of purpose be shown in order that the vessel be held innocent? A belligerent cruiser could hardly be left to decide such questions, and the only safe course for a commanding officer, falling in with a neutral vessel under such suspicious circumstances, would be to send her into one of his own ports, that the facts might be passed upon by a competent court.

The doctrine of continued, or continuous, voyages, first laid down by Sir Wm. Scott, with reference to colonial trade, has been applied by the Courts of the United States to blockades as well. It has been held that, even if a vessel stops at an intermediate neutral port, or transfers her cargo to another vessel to be carried on, or even if the cargo is consigned to a person at the neutral port and duties paid in order to cover the transaction, provided the ultimate destination to a blockaded port, or in the case of contraband goods, to the enemy's country, can be proved, the vessel on any part of her voyage, and the cargo before or after being landed, are held liable to confiscation. †

Sec. 13. Continuous voyages.

A further extension of this doctrine arose during the War of Secession, the courts of the United States holding that, in the case of vessels and goods bound to the Rio Grande, where the goods were taken by lighters to Matamoras and thence to the American side of the river, there was sufficient ground for condemnation. Neutrals could not be prohibited from sending goods to a Mexican port, but if proof could be adduced of their ultimate destination to any portion of the territory under blockade, they could be seized as if sent directly to a blockaded

\* Woolsey, Sec. 188.

† Blatchford, pp. 387-434. The Stephen Hart and Springbok.

port, although to reach their ultimate destination, land carriage through a neutral territory would be required.\*

Case of the  
Springbok.

The decision of the Supreme Court of the United States in the case of the *Springbok*, on appeal, was as follows: "We have already held in the case of the *Bermuda*, where goods, destined ultimately for a belligerent port, are being conveyed between two neutral ports by a neutral ship, under a charter made in good faith for that voyage, and without any fraudulent connection on the part of her owners with the ulterior destination of the goods, that the ship, though liable to seizure in order to the confiscation of the goods, is not liable to condemnation as prize.

"Upon the whole case we cannot doubt that the cargo was originally shipped with the intent to violate the blockade; and that the owners of the cargo intended that it should be transhipped at Nassau into some vessel more likely to succeed in reaching safely a blockaded port than the *Springbok*; that the voyage from London to the blockaded port was, as to cargo, both in law and in the intent of the parties, one voyage; and that the liability to condemnation, if captured during any part of that voyage, attached to the cargo from the time of sailing."† The cargo was condemned, and the vessel restored without costs or damages to claimants.

Case of the  
Peterhoff.

In the case of the *Peterhoff*, the decree of condemnation in the District Court was reversed as to the vessel and innocent portion of the cargo, on the ground that the blockade did not affect the interior communications with the enemy's territory. The Supreme Court held that "Contraband merchandise is subject to a different rule in respect to ulterior destination than that which applies to merchandise not contraband. The latter is liable to capture only when a violation of blockade is intended; the former when destined to the hostile country, or to the actual military or naval use of the enemy, whether blockaded or not. The trade of neutrals with belligerents in articles not contraband is absolutely free, unless interrupted by blockade; the conveyance by neutrals to belligerents of contraband articles is always unlawful, and such articles may always be seized during transit

\* Blatchford, p. 463. The *Peterhoff*.

† Wallace's Rep., Vol. V, pp. 21-27.

by sea. Hence, while articles, not contraband, might be sent to Matamoras and beyond to the rebel region, where the communications were not interrupted by blockade, articles of a contraband character, destined in fact to a State in rebellion, or for the use of the rebel military forces, were liable to capture though primarily destined to Matamoras."\* The vessel was restored on payment of costs and expenses.

The blockade being established after due notification, and maintained by an adequate force, any one of the following acts will subject the neutral vessel to capture and condemnation:

1. Sailing for a blockaded port with knowledge of the blockade, however acquired, unless an alternative destination is clearly shown on the ship's papers, and proper inquiries made before approaching the port.

2. Entering or quitting a port under blockade, or showing an immediate intention of doing so.

3. Entering a blockaded port in the temporary absence of the blockading squadron, caused by stress of weather, or the blockading vessels being in chase, and where the intention of returning is preserved.

4. Sailing for a blockaded port after notification, even where an intermediate neutral port intervenes and the cargo is landed or transhipped to another vessel to complete the voyage.

5. Attempting to enter a blockaded port after being warned off by a blockading vessel.

6. Not immediately quitting the vicinity of a blockaded port after being warned off.

7. Sailing with cargo taken on board after the blockade was established, or beyond the limit of time fixed by the belligerent for neutral vessels to quit the port.

"As a general rule the penalty for a breach of blockade is the confiscation of both ship and cargo; but if their owners are different, the vessel may be condemned irrespectively of the latter, which is not confiscated when the person to whom it belongs is ignorant at the time of shipment that the port of destination is blockaded, or if the master of the vessel deviates to a blockaded harbor. If, however, such deviation takes place to a port the blockade of which was known before the ship

Sec. 14. Summary.

Sec. 15. Penalty for breach of blockade.

\* Wallace's Rep., Vol. V, p. 61.

sailed, the act is supposed to be in the service of the cargo, and the complicity of its owner is assumed.”\*

“The penalty is confiscation, and it falls first on the ship as the immediate agent in the crime. The cargo shares the guilt, unless the owners can remove it by direct evidence. The presumption is that they knew the destination of the vessel, for the voyage was undertaken on account of the freight. If ship and cargo are owned by the same persons, the cargo is confiscated of course.”†

Duration of liability.

“The offence incurred by a breach of blockade generally remains during the voyage; but the offence never travels on with the vessel further than the end of the return voyage, although if she is taken in any part of that voyage, she is taken *in delicto*. This is deemed reasonable, because no other opportunity is afforded to the belligerent cruisers to vindicate the violated law. But where the blockade has been raised between the time of sailing and the capture, the penalty does not attach, because the blockade being gone, the necessity of applying the penalty to prevent future transgression no longer exists. When the blockade is raised, a veil is thrown over everything that has been done, and the vessel is no longer *in delicto*. The *delictum* may have been completed at one period, but it is by subsequent events done away.”‡

“Besides the penalty on cargo and vessel, the older text-writers teach that punishment may be visited upon the direct authors of a breach of blockade. But the custom of nations, if it ever allowed such severities, has long ceased to sanction them.”§

By the articles of war for the navy, all persons taken on board a prize are to be well treated, and any one guilty of maltreating them in any way may be punished at the discretion of a court martial. They are to be subjected to no further restraint than may be necessary to secure the prize against recapture. The officers and crew of a vessel captured for breach of blockade are not to be taken out of her except in cases of necessity.

Sec. 16. What is permitted to neutrals.

“A fair possibility, derived from the expectation of peace, or from other sources, that a blockade is raised may justify a vessel in sailing contingently for the port in question with the intention of inquiring at the proper place into the fact.

\* Hall, p. 627.

† Lawrence's Wheaton, p. 844.

‡ Woolsey, Sec. 188.

§ Woolsey, Sec. 188.

"Common fame in regard to the breaking up of a blockade will justify the neutral in sailing for the blockaded port."\*

"When a maritime blockade does not form part of a combined operation by sea and land, internal means of transport by canals, which enable a ship to gain the open sea at a point which is not blockaded, may be legitimately used. The blockade is limited in its effect by its own physical imperfections. Thus, during a blockade of Holland, a vessel and cargo sent to Embden, which was in neutral territory, and issuing from that port, were not condemned.

"Again, if a vessel is driven into a blockaded port by such an amount of distress from weather or want of provisions or water as to render entrance an unavoidable necessity, she may issue again, provided her cargo remains intact. And a ship which has been allowed by a blockading force to enter within its sight, is justified in assuming a like permission to come out; but the privilege is not extended to cargo taken on board in the blockaded port.

Vessels in distress.

"The right possessed by a belligerent of excluding neutral ships of war from a blockaded place is usually waived in practice as a matter of international courtesy; and for a like reason the minister of a neutral State resident in the country of the blockaded ports is permitted to despatch from it a vessel exclusively employed in carrying home distressed seamen of his own nation."†

The following instructions to commanding officers are found in Admiral Pareja's order for the conduct of the blockade of the Chilean ports in 1865: "If from stress of weather, want of provisions, etc., a neutral vessel should desire to enter a blockaded port, you will allow her to do so, on exhibiting evidence of the necessity that she is under. But if the vessel should carry contraband of war, you will cause it to be deposited in your own vessel and in others on the blockade, or if the master prefers, let him bind himself to retain it on board until his departure; in which case be careful that this document is as explicit as possible."‡

Admiral Pareja's order of blockade.

Neutral vessels are not liable for violation of blockade in the following cases:

Summary.

1. Sailing in ignorance of a properly notified blockade.

\* Woolsey, Sec. 187.

† Hall, p. 627-8.

‡ Dahlgren, p. 110.



2. Sailing for a port blockaded *de facto* only.
3. Sailing from a distant port for a port blockaded under treaty stipulations.
4. Sailing contingently for a blockaded port with expectation of peace.
5. Sailing for a port where common fame declares the blockade to be raised.
6. Entering a blockaded port in distress.

Sec. 17. Neutral  
vessels of war  
and blockade.

Can neutral vessels of war be excluded from ports under maritime blockade? The right of exclusion is claimed, and in some cases, as by the French Government in the blockades of Mexico and the Argentine Confederation in 1837 and 1838, has been exercised, but it is generally waived in practice. The instructions given to French naval commanders, in the cases referred to, were to exclude neutral men-of-war by force, if necessary. Ortolan and Hautefeuille approve this course, but in discussing blockades in general, admit that maritime blockade has no other object than to exclude all commerce by sea with the blockaded ports, which object is attained when the prohibition to enter or quit such ports is applied to merchant vessels.\*

Mr. Wheaton's  
opinion of ex-  
cluding vessels  
of war.

Mr. Wheaton, while United States Minister at Berlin, wrote to the Secretary of State, in July, 1846, "Most certainly the right of visitation and search cannot be applied to a public ship of war of another nation, so as to ascertain whether she has on board specie or quicksilver; but it is equally certain that a public ship of war of a neutral has no right to enter a blockaded port, nor to come out of it, unless she happened to be there at the time when the blockade was first established."† This was written in reference to the statement that, during the French blockade of Mexican ports in 1838, British men-of-war had been allowed to enter the port of Vera Cruz with quicksilver for working the mines, and to sail with specie on British account. The special circumstances of the case are to be considered. Wheaton expresses no such opinion in favor of exclusion of men-of-war in his *Elements of International Law*.

Mr. Hall says: "A blockade is considered to be an act of war which affects, of right, not only the subjects of a neutral state, but also persons and things partaking of the national character.

\* Ortolan, Vol. II, p. 334. Hautefeuille, Vol. II, p. 219.

† Mr. Wheaton to Mr. Buchanan, July 1.

Strictly, access to the blockaded place is forbidden to ships of war as well as merchant vessels."\* He states, however, that the right is usually waived for reasons of international courtesy.

In the Spanish blockade of Chilian ports in 1865, neutral men-of-war were freely permitted to enter blockaded ports, the order of blockade containing special instructions to that effect.†

American naval commanders have usually claimed the right of entry for public vessels, and have when conducting blockades permitted neutral men-of-war to pass the blockade, except where military operations on shore within the line of blockade prevented.

Position held by  
American com-  
manders-in-  
chief.

The following instances are cited by Rear-Admiral Dahlgren :

In 1826, Commodore Elliott sent one of the vessels of his squadron into Buenos Ayres, in spite of the objection of the Brazilian Admiral blockading that port. The same action was taken by Commodore Biddle at the same port in 1827.

In 1829, Commodore Biddle sent the *Ontario* into Algiers, then blockaded by a French squadron.

"In 1823, Commodore Biddle was sent in the Congress to land a United States Minister at Cadiz, then blockaded by the French as the headquarters of the Constitutional Government, but he was instructed not to insist upon entering if the French Commander objected. He did object, and Commodore Biddle did not enter. It is, however, understood that the French Government disapproved of the action of its officers."‡

"Admiral Dupont's order of blockade contained a direction to that effect (to permit the entry of neutral men-of-war), and I adhered to the same course off Charleston, until the operations within the blockade changed the condition of things. In a personal interview with a British commander who sought to enter, I informed him that the intervention of our lines of attack prevented his entering, not the blockade."§

The neutral government has always a right of communication with its agents in the belligerent territory, and on this ground, the right of a neutral vessel of war to claim the privilege of entering a blockaded port would seem clear.

"Sir William Scott seems to have expressed the opinion, in a case before him, in 1811, that a belligerent had no right to

\* Hall, p. 616.

† Admiral Pareja's Order, Dahlgren, p. 114.

‡ Dahlgren, p. 57.

§ *Ibid.*

interrupt the communications between a neutral government and its representative in a foreign country, through a port, the trade to which would otherwise be illegal; at any rate if the despatches are carried in a public manner, in vessels commissioned by the State for that purpose, and vested with the character of packets.”\*

The right of exclusion has not been at any time conceded by the United States; the language of all treaties where blockade is defined being clearly applicable to merchant vessels only.

Sec. 18. Mail  
steamers and  
blockades.

It may be a question how far a blockade should restrict the operations of regular lines of mail steamers, and whether the service carried on by them should be permitted with blockaded ports. Much will probably be left in this respect with the officer charged with the establishment of the blockade. The opinion quoted in the preceding section will influence largely any action taken with regard to mail steamers, and the present tendency is towards giving them special immunities during war.

During the war between the United States and Mexico, British mail steamers were allowed to enter and depart regularly from Vera Cruz, and during the Spanish blockade of Chilean ports in 1865-6, mail steamers were allowed to continue their regular service, of course, under guarantee not to engage in any contraband trade. The same course was observed during the late war between Chili and Peru.

As having a bearing on this subject, the Postal Convention of 1848, between the United States and Great Britain, may be cited. By Article XX of that Convention it is provided that, “In case of war between the two nations, the mail packets of the two offices shall continue their navigation without impediment or molestation until six weeks after a notification shall have been made, on the part of either of the two Governments, and delivered to the other, that the service is to be discontinued; in which case they shall be permitted to return freely, and under special protection, to their respective countries.”

Sec. 19. Pacific  
blockade.

“Since the beginning of the present century what is called pacific blockade has been used as a means of constraint, short of war, and the larger number of the few writers who mention it appear not to regard it as reprehensible. The first instance

\* Lawrence's Wheaton, p. 827, *u*.

occurred in 1827, when the coasts of Greece were blockaded by the English, French and Russian squadrons, while the three powers still professed to be at peace with Turkey. Other like blockades followed in rapid succession during the next few years. The Tagus was blockaded by France in 1831, New Grenada by England in 1836, Mexico by France in 1838, and La Plata from 1838 to 1840 by France, and from 1845 to 1848 by France and England. Since the last-mentioned year no fresh instance has occurred. The practice is not one therefore which has any pretension to have established itself by usage; it must stand or fall by reference to general principle. From this point of view it is difficult to see how it can be defended. Blockade is not a measure which affects blockaded States alone. When access to a port is closed every one suffers, the course of whose business leads him to come in or go out of it; and third States only consent that their subjects shall be exposed to the loss and inconvenience inseparable from interruption of trade as one of the concessions which it has become habitual for neutrals to make to belligerents. Blockade is thus essentially an incident of war.

"The real question is whether a State in time of peace can endeavor to obtain redress from a second State for actual or supposed injuries by means which inflict loss and inconvenience upon other countries. Lord Palmerston at any rate thought not. In writing to Lord Normanby, the Ambassador at Paris in 1846, with reference to the blockade of La Plata, he said: 'The real truth is, though we had better keep the fact to ourselves, that the French and English blockade of the Plata has been from first to last illegal. Peel and Aberdeen have always declared that we have not been at war with Rosas; but blockade is a belligerent right, and unless you are at war with a State you have no right to prevent ships of other States from communicating with ports of that State; nay, you cannot prevent your own merchant ships from doing so.'"\*

"The higher French courts decided, in the case of a Brazilian vessel seized for breach of blockade, that a part of her cargo, which had been condemned by an inferior court on the ground of being contraband of war, should be restored, because there was no war and therefore no contraband of war. The

\* Hall, p. 312, *et seq.*

vessel and the rest of the cargo had been exempted from the decision of the lower court on the ground of the want of special notification.

"The right of blockade is one affecting neutrals, and a new kind of exercise of this right cannot be introduced into the law of nations without their consent. The rights most analogous, civil and hostile embargo, may be said to be dying out, and neutrals have not given their consent to this new form of restriction of their rights. They would, if such a practice were continued, regard a pacific blockade as an act of war under a wrong name, or claim damages for all injury thereby inflicted on their commerce, which only war rights can interfere with."\*

Neutrals would not to-day submit to the restrictions placed upon their trade by measures of blockade, unless instituted in the prosecution of open declared war.

Sec. 20. Paper  
or cabinet  
blockade.

Paper blockade, formerly used with such disastrous effect on commerce by several European nations, has long been obsolete and has been prohibited by the Declaration of Paris. This was the notification of a blockade, but without sending an adequate force to maintain it, or, as in some cases, a mere declaration that an enemy's coast was under blockade and all commerce with his ports interdicted, without the presence of any blockading force. It was, of course, useless without the right to capture vessels bound to ports thus declared under blockade, but with that right it became destructive to neutral commerce.

Declaration of  
Paris, 1856.

Mr. Marcy, in his answer to the invitation to the United States to unite in the Declaration of Paris, said: "The fourth principle contained in the 'declaration,' namely: 'Blockades, in order to be binding, must be effective; that is to say, maintained by a force sufficient really to prevent access to the coast of the enemy'; can hardly be regarded as one falling within that class with which it was the object of the congress to interfere; for this rule has not, for a long time, been regarded as uncertain, or the cause of any 'deplorable disputes.' If there have been any disputes in regard to blockades, the uncertainty was about the facts, but not the law. Those nations which have resorted to what are appropriately denominated 'paper blockades,' have rarely, if ever, undertaken afterwards to justify their conduct

\* Woolsey, p. 443, n. 8.



upon principle; have generally admitted the illegality of the practice, and indemnified the injured parties.”\*

Certain sections of an Act of Congress of July 13, 1861, contemplated closing to commerce ports in the Southern States, not in possession of the government, but without establishing a blockade over them. No attempt was made, however, to enforce the provisions of the act against citizens of foreign powers. France and Great Britain informed the government that they would consider such a law null and void, and that “they would not submit to measures taken on the high seas in pursuance of such decree.”

Sec. 21. Closing ports compared with blockade.

The position taken by those governments was fully warranted by principles of international law, and was also in accordance with the principles previously enunciated by the United States in regard to belligerents. The blockade of the whole Southern coast had been previously established after notification to neutral powers, and its validity recognized by them.

Mr. Lawrence says, in his notes on Wheaton, “Nor does the law of blockade differ in civil war from what it is in foreign war. Trade between foreigners and a port in possession of one of the parties to the contest cannot be interdicted by a municipal edict of the other. For this, on principle, the most obvious reason exists. The waters adjacent to the coasts of a country are deemed within its jurisdictional limits only because they can be commanded from the shore. It thence follows that whenever the dominion over the land is lost, by its passing under the control of another power, whether in foreign war or civil war, the sovereignty over the waters capable of being controlled from the land likewise ceases.”†

“The establishment of a blockade is of itself a recognition of a civil war, so far at least as regards neutral or foreign countries, and it was so held by our admiralty courts at the commencement of the pending hostilities.”‡

Lord Russell, writing to the British Minister at Washington in relation to this question, said: “Her Majesty’s government admit that a civil war exists; they admit that whether the Confederate States of the South be sovereign or not is the very

Lord Russell on closing ports.

\* Mr. Marcy to Count de Sartiges, July 28, 1856. President’s Mess. and Doc., 1856-7, p. 36.

† Lawrence’s Wheaton, p. 846, *n.*

‡ *Ibid.* p. 848.

point to be decided; but Her Majesty's government affirm, as the United States affirmed in the case of the South American Provinces, that 'the existence of this civil war gives to both parties the rights of war against each other.' Arguing from these premises, it is impossible for Her Majesty's government to admit that the President or Congress of the United States can at one and the same time exercise the belligerent right of blockade, and the municipal right of closing the ports of the South.

"In the present case, Her Majesty's government do not intend to dispute the right of blockade on the part of the United States with regard to ports in possession of the Confederate States, but an assumed right to close any ports in the hands of insurgents would imply a right to stop vessels on the high seas without instituting an effective blockade. This would be a manifest evasion of the necessity of blockade in order to close an enemy's port. Neutral vessels would be excluded when no force exists in the neighborhood of the port sufficient to carry that exclusion into effect. Maritime nations would not submit to this excess under the pretence of the rights of sovereignty."\*

The same position was assumed by Great Britain towards New Grenada in 1861, that Government announcing that certain ports in the hands of revolutionists were to be closed, but without establishing a blockade. The opinion given by legal advisers of Her Majesty's government, as expressed to Parliament by Lord Russell, was that "it is perfectly competent to the government of a country in a state of tranquillity to say which ports shall be open to trade and which shall be closed; but, in the event of insurrection or civil war in that country, it is not competent for its government to close the ports that are *de facto* in the hands of the insurgents, as that would be a violation of international law with regard to blockades."† The English Admiral commanding on the station was instructed not to recognize the closing of the ports in question.

"What measures can the State at war with a part of its subjects take in regard to foreign trade with revolted ports? To say that it cannot apply the rules of blockade, contraband and

\* Lord Russell to Lord Lyons, July 19, 1861.

† Lawrence's Wheaton, p. 848, *n.* See Sec. 6, Objects of blockade.

search, because the ports are *its own*, is mere pettifogging. But can it close these ports by an act of the government, as it once opened them? At first view it seems hard to refuse this right to a nation, but the better opinion is that foreigners, by having certain avenues of trade open to them, have thereby acquired rights. The nation at war within itself must overcome force by force, but this method of closing ports supersedes war by a stroke of the pen. It is the fact of obstruction in the ordinary channels of trade which foreign nations must respect. If the State in question cannot begin and continue this fact, it must suffer for its weakness."\*

The case after all resolves itself into a *de facto* loss of sovereignty, as stated by Mr. Lawrence, without any question as to the rights foreigners may have acquired by a course of trade with particular ports.

Rear-Admiral Dahlgren observes that the blockade was resorted to "when, in many cases, a closing of the ports would have served; but, as in other cases, the British government constrained our necessities."† This, however, is not a fair statement of the case. And, in any event, blockade is a far more effective measure and one much more extensive in its operations than a simple municipal closing of ports.

Mr. Justin McCarthy says, in reference to the correspondence between the two governments on this point: "International law on the subject is quite clear. A State cannot blockade its own ports. It can only blockade the ports of an enemy. It can, indeed, order a closure of its own ports. But a closure of the ports would not have been so effective for the purposes of the Federal government: it would have been a matter of municipal law only. An offender against the ordinance of closure could only be dealt with in American waters; an offender against the decree of blockade could be pursued into the open sea."‡

The United States Navy Department having, in 1861, tried the experiment of sinking hulks in the channels leading into the ports of Charleston and Savannah, in order to render the blockades of those ports more efficient, the "Stone Blockade," as it was called, drew forth a remonstrance from the govern-

Sec. 22. Obstructing ports.

\*Woolsey, Sec. 166 b.

† Dahlgren, p. 26.

‡ "A History of Our Own Times," Chap. XLIII.

ment of Great Britain. The British Minister at Washington was instructed, in December, 1861, to represent to the Secretary of State that "such a cruel plan would seem to imply utter despair of the restoration of the Union, the professed object of the war; for it could never be the wish of the United States to destroy cities from which their own country was to derive a portion of its riches and prosperity. Such a plan could only be adopted as a measure of revenge, and irremediable injury against an enemy. Even as a scheme of embittered and sanguinary war, such a measure was not justifiable. It would be a plot against the commerce of nations and the free intercourse of the Southern States of America with the civilized world."

To this Mr. Seward replied that "it was a mistake to suppose that the plan had been devised to injure the harbors permanently. It was a temporary military measure, adopted to aid the blockade. It had been found necessary, in consequence of the small naval force of the government, to close some of the numerous small inlets by sinking vessels in the channels. It would be the duty of the government of the United States to remove all these obstructions as soon as the Union was restored. It was well understood that this was an obligation incumbent on the Federal government. Vessels had been sunk by the rebels to prevent access to their ports by the cruisers of the United States. The same measures had been adopted by the United States to make the blockade more complete. When the war was ended, the removal of all these obstructions would be a mere matter of expense—there would be no great difficulty in removing them effectually."\*

During the Franco-Prussian War, Prussia, as a purely defensive measure, blocked up, or filled with torpedoes, a number of harbors in North Germany, and without question from any source. Measures of this nature, undertaken by a State within its own territories, in the prosecution of military operations, are not subjects of complaints from foreign powers any more than are blockade or visitation and search of their vessels on suspicion of carrying contraband of war.

Sec. 23. Modern  
tendency to  
freedom of  
trade.

The tendency of the present time of intense commercial activity is to claim for neutral trade the widest possible freedom, and the acts of a belligerent affecting such trade will be closely

\* Lawrence's Wheaton, p. 587, n.

scrutinized. Any restrictions will be limited as much as possible. But the belligerent imposing a blockade will naturally hold to the strict law of nations, as shown in judicial decisions, rather than follow the speculations of political economists. War between any two civilized nations necessarily involves the interests of others, but war confers upon a belligerent the right to inflict all the injury he lawfully may on his enemy: to a commercial nation an absolute suspension of all trade may be the most direct means of inflicting injury, and neutrals must submit to the incidental loss to their trade.

"It may be remarked, apart from existing law, and apart from all question whether blockades ought to be permitted at every place where they are now lawful, that the experience of the civil war in America has proved the use of steam to assist so powerfully in their evasion, as to render it unwise to shackle the belligerent with too severe restrictions. If it is wished altogether to deprive blockades of efficacy, it would be franker and better to sweep them away altogether."\*

\* Hall, p. 621.



## PART V.

### CONTRABAND OF WAR.

Sec. 1. The general effects of war on commerce.

The existence of a state of war confers on the parties to it the right to place certain restrictions, apart from blockade, on the trade of neutrals, it being admitted that the latter must not render any assistance to either belligerent in the conduct of military operations against the other.

It is agreed among nations recognizing the obligations of international law, that arms, ammunition, and warlike implements generally, shall not be furnished to either belligerent by neutrals, but there are other articles that may become of use in war, either directly or by conversion, and the classification of such articles as contraband of war, or as free goods, has depended largely upon the policy and needs of belligerents, where not decided by positive treaty stipulations.

The dominant maritime powers have generally endeavored to include articles of questionable use in the list of contraband, and to give to that list the widest extension, and text-writers have usually, in giving definitions of contraband, followed the policy of their respective countries as shown in the decisions of prize courts. On the other hand, nations less powerful at sea have uniformly protested against such extensions of the list, and have sought to restrict the character of contraband to articles of primary use in war. The policy of nearly all nations has thus varied with their naval power and influence, and they have been found at times advocating the most extended definition of contraband, and at others demanding that articles of direct and immediate use in war only should be so classed.

Varying policy of nations.

In fact, beyond the limited class of articles admitted by common consent to be contraband, it is impossible to lay down any positive rule except where it has been done by treaty stipulations. The nature of contraband will vary with circumstances, and articles of the utmost importance to a nation in carrying on

warlike operations at one time may be wholly unnecessary at another.

"It is the *usus bellici* which determines an article to be contraband; and as articles come into use as implements of war which were before innocent, there is truth in the remark, that as the means of war vary and shift from time to time, the law of nations shifts with them; not, indeed, by the change of principles, but by a change in the application of them to new cases, and in order to meet the varying inventions of war."\*

In this chapter it is proposed to give definitions of contraband of war by some of the leading writers on international law, and to show, from the decisions of prize courts, and treaty stipulations, what articles are held as contraband beyond any question. In the precedents furnished by decisions of the prize courts of his country, must be found, in the absence of formal definitions by treaty, the best guide for the naval officer in deciding cases of contraband.

"That the commerce of neutral nations may subsist in as great a degree of freedom as is consistent with the laws of war, there are certain rules to be observed, on which Europe seems to be generally agreed.

Sec. 2. Definitions.  
Vattel.

"The first is, carefully to distinguish ordinary goods, which have no relation to war, from those which are peculiarly subservient to it. *Neutral nations should enjoy perfect liberty to trade in the former; the belligerent powers cannot with any reason refuse it; or prevent the importation of such goods into the enemy's country;* the care of their own safety, the necessity of self-defence, does not authorize them to do it, since those things will not render the enemy more formidable. *An attempt to interrupt or put a stop to this trade would be a violation of the rights of neutral nations, a flagrant injury to them;* necessity, as we have above observed, being the only reason which can authorize any restraint on their trade and navigation to the ports of the enemy.

"Commodities particularly *useful* in war, and the importation of which to an enemy is prohibited, are called *contraband goods*. Such are *arms, ammunition, timber for ship-building, every kind of naval stores, horses*—and even provisions, in certain junctures, when we have hopes of reducing the enemy by famine."†

\* Kent, Vol. I, p. 148.

† Vattel, pp. 336–37.

Wheaton on  
contraband.

“The general freedom of neutral commerce with the respective belligerent powers is subject to some exceptions. Among these is trade with the enemy in certain articles called contraband of war. The almost unanimous authority of elementary writers, of prize ordinances, and of treaties, agrees to enumerate among these all warlike instruments, or material by their own nature fit to be used in war. Beyond these, there is some difficulty in reconciling the conflicting authorities derived from the opinions of public jurists, the fluctuating usage among nations, and the texts of various conventions designed to give to that usage the

Grotius, fixed form of positive law. Grotius, in considering the subject, makes a distinction between those things which are useful only for the purposes of war, those which are not so, and those which are susceptible of indiscriminate use in war and peace. The *first*, he agrees with all other text-writers in prohibiting neutrals from carrying to the enemy, as well as in permitting the *second* to be so carried; the *third* class, such as money, provisions, ships, and naval stores, he sometimes prohibits, and at others permits, according to the existing circumstances of the war.”\*

Bynkershoek.

“Bynkershoek strenuously contends against admitting into the list of contraband articles those things which are of promiscuous use in peace and war.’ He considers the limitation assigned by Grotius to the right of intercepting them, confining it to the case of necessity, and under the obligation of restitution or indemnification, as insufficient to justify the exercise of the right itself. He concludes that the materials out of which contraband articles may be formed are not themselves contraband, because if all the materials may be prohibited, out of which something may be fabricated that is fit for war, the catalogue of contraband goods will be almost interminable, since there is hardly any kind of material out of which something, at least, fit for war may not be fabricated. The interdiction of so many articles would amount to a total interdiction of commerce, and might as well be so expressed. He qualifies this general position by stating that it may sometimes happen that materials for building ships are prohibited, ‘if the enemy is in great need of them, and cannot well carry on the war without them.’ He also states, ‘that provisions are often excepted’ from the general freedom of neutral

\* Lawrence’s Wheaton, p. 767. *et seq.*

commerce 'when the enemies are besieged by our friends, or are *otherwise* pressed by famine.' " \*

" Nothing can be justly regarded as contraband, unless so Woolsey. regarded by the law of nations, or by express convention between certain parties. The definition of contraband must be *clear* and positive. For as belligerents are authorized to inflict severe evils on neutrals trading in contraband articles, it is plain that *they* alone cannot define in what contraband consists. The heavy penalty implies a heavy crime, understood to be such when the penalty was allowed. There must be certain kinds of articles, such as afford direct assistance, *not to the enemy, but to the enemy's military operations*, and *known beforehand*, and hence implying a departure from the spirit and rules of neutrality, which can be seized and confiscated. Or, since the articles of *direct use* in war may change from age to age, at the most, new articles,—as for instance in these days of war-steamers, steam engines, coals, and the like,—can justly come into this list, *only* when there is satisfactory proof that they are for the direct uses of war. And this, of course, only where treaty has not specified certain definite articles, and such alone." †

This is rather what the rule of contraband should be, than what it actually is. Certainly the prize courts of the United States have not required positive proof that articles susceptible of the character of contraband were destined for direct use in hostile operations; proof of destination to the enemy's country having been always sufficient to warrant condemnation.

The following classification by Rear-Admiral Dahlgren, based on the experience of the War of Secession in the United States, and the decisions of the courts, is much the safest guide for the American naval officer :

" 1st. Cannon, muskets, and their implements and munitions, Dahlgren. entire or in parts; gunpowder and its components, nitre and sulphur; all kinds of military clothing and their fabrics and equipments, torpedoes and apparatus therefor.

" 2d. Naval stores, such as tar, pitch, rosin, ship timber, sails, hemp, cordage, copper in sheets, steam machinery for sea steamers, entire or in parts; vessels adapted to war or their armor.

\* Lawrence's Wheaton, pp. 779-80.

† Woolsey, Sec. 180.

"3d. Provisions, coal and other articles which, though not in their nature for war, yet by their destination for a blockaded place, or hostile fleet or army, may serve the purposes of war.

"Many of the above come directly under the law of admitted contraband, such as those enumerated in the first head; and most of those under the second head have been decided on in the courts, as the remainder probably will be when brought there. As regards the articles under the third head, the officer must be guided as to their intended use, by the exercise of a sound discretion as to their final destination."\*

Parsons. Professor Parsons defines contraband as, in his opinion, settled by the practice of maritime nations: "A trade with a belligerent, intended to provide him with military supplies, equipments, instruments, or arms. Goods are contraband which are in fact munitions of war, or may certainly become so, or which are designed, or capable of being used, for the support or assistance of an enemy in carrying on war, offensively or defensively. Thus, even provisions, if they are intended to be sent to a place which an enemy is attempting to reduce by starvation, and, in general, articles ordinarily used only for peaceful purposes, if capable of a military use, and sent to places where it is probable that such a use will be made of them, are contraband of war; and so is all property destined to a besieged or blockaded town."†

Reddie. A late English writer has defined contraband to be: "1. Articles which have been constructed, fabricated, or compounded into actual instruments of war; 2. Articles which, from their nature, qualities, and quantities, are applicable and useful for the purposes of war; 3. Articles which, although not subservient generally to the purposes of war, such as grain, flour, provisions, naval stores, become so by their special and direct destination for such purposes, namely, by their destination for the supply of armies, garrisons, or fleets, naval arsenals and ports of military equipment."‡

Great Britain. The British Orders in Council, issued February 18, 1854, in anticipation of the war with Russia, prohibited the exportation of certain articles from the United Kingdom. These

\* Dahlgren, pp. 92-93.

† Marit. Law, Vol. II, pp. 93-94.

‡ Reddie, Mar. Internat. Law, Vol. II, p. 456.



Orders did not pretend to decide the question of contraband, being only municipal in their character, and intended to keep articles useful in war within the kingdom; they may be considered to some extent as indicating the position of the government, at that time, as to contraband. The articles enumerated are "arms, ammunition, and gunpowder, military and naval stores, marine boilers, engines and propellers, and all articles that are, or can, or may become applicable to the manufacture of marine machinery."

A subsequent Order, issued April 24, 1854, reduced the prohibited articles to three classes only, namely, "1. Gunpowder, saltpetre, and brimstone; 2. Arms and ammunition; 3. Marine engines and boilers and the component parts thereof." These articles could not be exported without a special permit from the Privy Council, to any port north of Dunkirk or east of Malta.

"By the French Ordinance of 1681, which is still the rule, France. it being recognized in the Ordinance of 1778, which abolished the intervening regulations, only arms and ammunition are regarded as contraband; though during the wars of the French Revolution, all distinctions on this point, as in other matters relating to neutrals, were often practically disregarded."\*

"On the outbreak of war between France and England in 1793, the Convention decreed that neutral vessels laden with provisions destined to an enemy's port should be brought in for pre-emption of the cargo, although treaties were then existent between France and the Hanse Towns, Hamburg, the United States, Mecklenburg, and Russia, in which it was stipulated that provisions should not be contraband of war. But the Prize Courts seem to have acted upon the rules of the Ordinance of 1681; and of the few treaties which have been concluded by France during the present century, only one varies from the form which is usual in her conventions."†

M. Ortolan objects to the wide extension of contraband given Ortolan.

\* Lawrence's Wheaton, p. 797, *n*.

† Hall, p. 572. It is to be noted that France has lately, in the operations on the coast of China, declared rice, under some circumstances, to be contraband. It does not appear, however, that any cases of condemnation of rice cargoes have occurred; certainly not where foreign citizens were concerned.

by English writers and prize courts, and is "of the opinion that the freedom of neutral commerce ought to furnish the general principle, to which only such restrictions should be applied as are an immediate and necessary consequence of the state of war between the belligerents." He therefore holds that—

"Arms and instruments of war, and munitions of every kind directly serving for the use of those arms, are the only objects generally and necessarily contraband of war.

"Raw materials or merchandise of every kind fitted for peaceful use, even though equally capable of being employed in the manufacture or application of arms, instruments and munitions of war, are not strictly comprised in this contraband. It is, at most, permitted to a belligerent power, in view of some special circumstance affecting its military operations, to treat such articles as contraband; but they ought to be so assimilated as a rare exception, which should be limited to those cases in which they in fact form a disguised contraband, that is to say, in which they are tainted with fraud.

"Provisions and all other objects of first necessity are incapable of being included in any case, or for any reason, among goods contraband of war."\*

He admits among the articles that may be regarded as contraband according to the circumstances of the case, "timber, evidently intended and worked for the construction of ships of war or gun carriages, boilers and engines for the enemy's steamers, sulphur and saltpetre for making gunpowder, or other elements of arms and military stores."†

Hautefeuille. M. Hautefeuille excludes from the list of contraband all articles of promiscuous use in peace and war. He admits of but one class, and limits that strictly to articles of the first necessity in war; articles which are useful only in war, and which can be employed directly in war without undergoing any change; that is, arms and munitions of war only. "Nothing else is contraband but arms and munitions of war, actually manufactured, proper, immediately, and without any preparation or transformation by human industry, to be employed in the uses of war, and not capable of receiving any other destination."‡

\* Ortolan, Vol. II, p. 190.

† *Ibid.* p. 206.

‡ Hautefeuille, Vol. II, p. 419.

This is a much stricter limit to contraband goods than has ever been accepted by prize courts.

Mr. Hall, after quoting Kent, Wheaton, Manning, Ortolan, <sup>Hall.</sup> Bluntschli and Heffter, remarks that "The language of each of the above writers distinctly involves the proposition that contraband of war cannot be limited to munitions of war, and that the articles composing it must vary with the special circumstances of particular cases. This proposition is the simple expression of common sense. There can be no question that many articles, of use alike in peace and war, may occasionally be as essential to the prosecution of hostilities as are arms themselves; and the ultimate basis of the prohibition of arms is that they are essential. The reason that no difference of opinion exists with respect to them is the fact that they are in all cases essential.

"But it may also happen, after a remote non-manufacturing country, such as Brazil, has suffered a disaster at sea, that to prevent the importation of marine engines would be equivalent to putting an end to the war, or would at least deprive the defeated nation of all power of actively annoying its enemy. In considering the matter logically therefore, the true difficulty is the test of essentiality. Under what circumstances can the seizure of merchandise of double use be justified?

"The principle that the right to class a particular object as contraband is intimately bound up with the fact of its possession being essential to the belligerent for his warlike purposes will scarcely be contested by any publicist. The belief that no article except munitions of war can be so essential as to warrant interference with trade appears to underlie the doctrine of one school of writers; the statement that the contrary is true is explicitly made by the adherents of the opposite opinion; but these are mere differences of opinion as to the value of facts; upon the question of theory there is general agreement. The policy of nations, on the other hand, has been governed by no principle. The wish to keep open their own or a foreign market has usually been a motive quite as powerful as the hope of embarrassing an enemy, and it has led to a thoroughly confused practice. Usage does not conform to principle, and at the same time no sufficient rule can be extracted from it."\*

\* Hall, pp. 578-9.

Dana. "It may be safely assumed that prize courts of Great Britain and the United States, in the absence of treaty stipulations or of rules of their governments, would inquire into the circumstances of each case, to determine whether articles *ancipitus usus* were contraband of war; and that in that class they would include ships, marine steam-machinery, masts and spars in a manufactured state, the component materials of gunpowder, coals, articles in a manufactured state chiefly useful in war, or the component parts of armaments and military equipments. The chief circumstances of inquiry would naturally be the port of destination. If that is a naval arsenal, or a port in which vessels of war are usually fitted out, or in which a fleet is lying, or a garrison town, or a place from which a military expedition is fitting out, the presumption of military use would be raised, more or less strongly according to the circumstances. The nature and character of the war, as being maritime or not, and the known special needs of the enemy, are also to be considered. If it is proved, as a fact in the case, that the articles are destined directly to military use—as if they were to be delivered to an enemy's fleet, or army, or war department—they would be condemned for the further reason of being involved in a non-neutral trade."\*

Sec. 3. Treaties  
of the United  
States.

The United States have generally, in discussions respecting contraband, favored a limited list of articles to be classed as contraband of war, and in many treaties have agreed to consider as contraband only arms, and such articles as are prepared and serve directly for purposes of war. But the policy of our government has not been consistent on this point, and no general rule can be laid down; each treaty now in force must be referred to where the parties to them are engaged in war.

The following list of articles held to be contraband is taken from the treaty concluded with Bolivia in 1858:†

"This liberty of navigation and commerce shall extend to all kinds of merchandise, excepting those only which are distinguished by the name of contraband of war, and under this name shall be comprehended,—

"1st. Cannon, mortars, howitzers, swivels, blunderbusses,

\* Dana's Wheaton, p. 632, n.

† U. S. Treaties, 1873, "Bolivia," pp. 85-86.

muskets, fuses, rifles, carbines, pistols, pikes, swords, sabres, lances, spears, halberds, and grenades, bombs, powder, matches, balls, and all other things belonging to the use of these arms.

"2d. Bucklers, helmets, breast-plates, coats of mail, infantry belts and clothes made up in the form and for military use.

"3d. Cavalry belts, and horses, with their furniture.

"4th. And, generally, all kinds of arms, offensive and defensive, and instruments of iron, steel, brass, and copper, or any other materials manufactured, prepared, and formed expressly to make war by sea or land.

"All other merchandises and things not comprehended in the articles of contraband explicitly enumerated and classified as above, shall be held and considered as free, and subjects of free and lawful commerce, so that they may be carried and transported in the freest manner by the citizens of both contracting parties, even to places belonging to an enemy, excepting only those places which are at that time besieged or blockaded."

The following treaties give exactly the same list of contraband, and hold the same language as to freedom of trade: Dominican Republic, 1867; Ecuador, 1839; Guatemala, 1849; Hayti, 1864; Mexico, 1848.

The treaties with the United States of Colombia, 1846, and San Salvador, 1850, give the same list of articles directly contraband, but add "provisions that are imported into a besieged or blockaded place." These are the only treaties, it may be noted, concluded by the United States subsequent to the treaty of 1794 with Great Britain, in which it is admitted that provisions became contraband under any circumstances. The reason for including them in the list of contraband in the cases named is not clear, since they would be condemned on another ground, namely, breach of blockade.

The following treaties contain substantially the same list of contraband as that given above:

Italy, 1871, the treaty "expressly declares that the following articles and no others shall be considered under this denomination." Horses are omitted from the list, but "war saddles and holsters" are included.

Holland, 1782, "soldiers, saltpetre, sulphur, and saddles" are included. Naval stores of all kinds are expressly excepted from the list of contraband, "even if suited for the construction



and equipment of vessels of war and for the manufacture of implements of war."

Sweden, 1783, renewed by the treaty with Sweden and Norway, 1827, includes "sulphur and saltpetre," and expressly excludes naval stores.

Spain, 1795, includes "saltpetre," and excludes naval stores. Vessels of war of either party may, in cases of necessity, take any portion of the cargo of merchant vessels belonging to the other, paying for the articles taken the same price as would have been realized at the port of destination.

Prussia, 1799, renewed by the treaty of 1828, includes "saltpetre and sulphur," and omits horses.

France, 1800, includes "saltpetre" in the list, but omits horses. Venezuela, 1860, adds "saltpetre" to the list.

Treaties with Brazil, 1828, Chile, 1832, and Peru, 1851, contained the same list of contraband as that given in the treaty with Bolivia, but were all terminated in pursuance of formal notifications given by those governments.

The treaty with Great Britain of 1794, terminated by limitation, in addition to the usual list of arms and munitions of war, omitted horses, but included "saltpetre," and also "timber for ship building, tar or rosin, copper in sheets, sails, hemp and cordage, and generally whatever may serve directly to the equipment of vessels, unwrought iron and fir planks only excepted." The treaty further agrees that provisions and other articles not generally contraband, becoming so "according to the existing law of nations," and seized for that reason, shall not be confiscated, but the owners shall be speedily and completely indemnified.

It follows then that the United States, at present, hold defined and limited agreements as to contraband with Bolivia, the United States of Colombia, the Dominican Republic, Ecuador, France, Guatemala, Hayti, Holland, Italy, Mexico, Prussia, San Salvador, Spain, Sweden and Norway, and Venezuela.

With other nations than those named above the United States have no agreement as to contraband goods, and the prize courts would determine, according to public law, the character of merchandise shipped to an enemy's ports.

While the treaties with Great Britain, Brazil, Chile and Peru, where contraband is defined, have terminated by limitation or

after notification, it may be assumed that the courts would, in passing upon cases involving the property of citizens of those countries, be guided to a great extent by the policy expressed in those treaties. This was seen during the War of Secession in the United States, when the prize courts, in deciding cases affecting British property, adopted the practice of the British Admiralty Courts.

"The rules of International Law recognized by the authorities in the United States are those admitted by common custom at the period when the United States became independent, except when modified by treaty. And the practice of our prize courts, which are the real expounders of the law, conforms to that of the British courts, except when modified by treaty."\*

Sec. 4. Decisions  
of Courts of  
the United  
States.

"As it is impossible to ascertain positively the final use of an article *ancipitus usus*, it is not an injurious rule which deduces the final use from the immediate destination; and the presumption of a hostile use, founded on its destination to a military port, is very much inflamed, if, at the time when the articles were going, a considerable armament was notoriously preparing, to which a supply of those articles would be eminently useful.

"These doctrines of the English prize law were essentially the same with that adopted by the American Congress in 1775, for they declared that all vessels, to whomsoever belonging, carrying provisions or other necessities to the British army or navy within the colonies, should be liable to seizure and confiscation. They were likewise fully adopted by the Supreme Court of the United States, when we came to know and feel the value of belligerent rights by becoming a party to a maritime war."†

"The court, also, in the decision of the cases growing out of the war of 1812, reported before Mr. Wheaton's connection with them, had declared that, as the United States at one time formed a component part of the British Empire, their prize law was, as understood at the time of separation, the prize law of the United States, though no recent rules of the British courts were entitled to more respect than those of other countries; yet that, where there were no reasons to the contrary, they should regard the decisions of the English Courts of Admiralty."‡

\* Dahlgren, p. 85.

† Kent, p. 147.

‡ Lawrence's Wheaton, p. 974, n.

In deciding cases brought before the District Court of the United States for the Southern District of New York, the following language was used by Judge Betts :

"The practice in prize proceedings in the courts of the United States is governed by the rules of admiralty law disclosed in the English reports, when not regulated by decisions or rules of the American courts."\*

"The law of prize, as universally established by the prize courts of Europe and the United States, declares that all instruments and munitions of war are to be deemed contraband, and that rule is held to embrace, by its terms and by fair construction, among other articles, all military equipments and military clothing. It is, also, an established doctrine of the English Admiralty, that all manufactured articles which, in their natural state, are fitted for military use, or for building and equipping ships of war, among which articles cordage is included, are contraband of their own nature, to the same extent as instruments and munitions of war, and no exception is admitted in their favor, except by express provisions of treaty.

Case of the  
Peterhoff.

"It is also claimed, on the part of the libellants, that the horseshoes contained in the 95 casks, and which the report of the commissioners described as horseshoes of large size, were designed for the cavalry service of the enemy, and were wholly unsuitable for any such existing service in Mexico ; that the anvils and blacksmiths' bellows were such as accompany army forges ; and that those articles, together with the tin, sheet zinc, hoop-iron, and cast-steel, the 2640 ounces of quinine, 265 pounds of chloroform, 1000 pounds of calomel, 16 pounds of opium, 38 ounces of morphine, and other drugs, and the blue military cloth, if not necessarily contraband in themselves, under all circumstances must, in view of the quantities of them found on board of the Peterhoff, and the demand existing for some if not all of them for the use of the army and navy of the enemy, be considered as contraband in the present case, if they were going to the country of the enemy. I do not intend to hold that any of these articles are contraband, other than such as come under the head of military equipments, military clothing, manufactured articles fitted, in their natural state, for military use, and

\* Blatchford, Prize Cases, p. 90. The Prince Leopold.

cordage, although strong reasons might be urged for including many of the other articles named within the list of contraband, under the circumstances surrounding this case.”\*

“ If the vessel is to deliver a contraband cargo into the hands and control of the enemy’s government, or of its executive officers, that makes the destination hostile, whether the place of delivery be at sea or in a neutral or a hostile port.”†

Sec. 5. Effect of destination.

“ But it is not necessary that there should be a proved intent to deliver into military hands to make the case one of contraband. The neutral will usually send his goods—whether purely contraband or *incipit* *us*, the one as well as the other—to a private consignee for sale in the market. He usually has, in fact, no intent in the matter but a commercial one, to sell his goods for the highest price. If his mortar and loaded shells will get a higher price from a humane society, to be placed on the coast to aid in rescuing shipwrecked mariners, or if his gunpowder will sell better to be used in blasting rocks, to build a church, his consignee will probably make such sales. The expectation or preference of the neutral for one use or another, belligerent or peaceful, of his goods, irrespective of their price, can rarely be ascertained by a prize court as a fact; and if articles useful in war come within a belligerent’s control, the belligerent government may buy them, or, in case of necessity, seize them, making compensation, without regard to the wishes of the owner or his agent. The truth is, the intent of the owner is not the test. The right of the belligerent to prevent certain things getting into the military use of his enemy is the foundation of the law of contraband; and its limits are, as in most other cases, the practical result of the conflict between this belligerent right, on the one hand, and the right of the neutral to trade with the enemy, on the other. Belligerent interests might well contend that any merchandise sent into his enemy’s country gives that enemy aid or relief, moral, financial, or physical. But to prevent such trade would be to end all neutral commerce. Neutral interests, therefore, insist on the strictest limits of the war-right of seizure, and have, at times, striven to confine the rule to instruments which are completed and are of exclu-

\* Blatchford, Prize Cases, p. 526. The Peterhoff.

† Dana’s Wheaton, p. 669, n.

sively military use. The result of this conflict has left rather an undefined and irregular line. Articles of doubtful use the belligerent seeks to condemn, on evidence or presumptions that they were in fact intended to be, or would in fact become, whatever the intent, a direct contribution to the military force of his enemy. The chief maritime belligerents have enforced this right, while the chief neutrals have argued against it in their books and diplomatic letters, and sought to restrict it in their treaties. So, where articles are not of a military character, but suitable for household food, as bread-stuffs, the belligerent claims the right to capture them, if bound to a port under the stress of actual siege, where the fate of the place may depend on the mere question of food. The ground is that the circumstances necessarily bring the food into the category of a direct supply of the military necessities of the enemy.”\*

“The Declaration of Paris of 1856, if it should be carried into effect in future wars, provides for the safe transport of belligerent goods in neutral vessels, and of neutral goods in belligerent vessels, provided in both cases that they are not contraband of war. It therefore becomes a material question to inquire into the nature of contraband, what amounts to the carrying of contraband, and what penalty is attached to its transport by neutral vessels.

“And this inquiry is the more necessary because the old law of contraband may be considerably modified in future wars. At the time the various treaties were made, and the points decided in the various Prize Courts of Europe and America, water transport was in reality the only practicable method of conveying certain classes of goods; but since the introduction of the steam-engine, transport by rail is far more expeditious and cheaper than by water. And therefore the contraband that was formerly of necessity carried to the belligerent commercial or naval port may now be taken to a neighboring neutral one, and there at once placed on railway trucks and carried to the ultimate place of destination. And this can be done with impunity according to the present law of contraband, for by the law of nations the transport of contraband of war to a neutral port by neutral ships is not an offence against international law. . . . In all probability in the future it will be determined, not

\* Dana's Wheaton, p. 633, n.



as a question of law, but of fact, whether contraband articles with an ultimate hostile destination are free from capture, though immediately destined to a neutral port, the transport being continued by rail.”\*

It has been already held by the District Courts of the United States, in cases of contraband, that destination to a neutral port will not protect from capture articles of contraband, where an ultimate destination to the enemy's country can be shown, the immediate neutral destination being used only to cover the transaction.”†

“The commerce which the law regards is that which is dependent upon the destination and intended use of the cargo on board of the vessel, and not on the incidental voyage of a vessel which may be but one of many carriers through which the property is to reach its originally intended destination. The proper inquiry, in testing the lawfulness of the transportation of contraband goods, is whether they are intended for sale or consumption in the neutral market, or whether the direct or intended object of their transportation is to supply the enemy with them.”‡

“It is equally well settled that the ulterior destination of contraband goods determines the character of the trade, no matter how circuitous the route by which they are to reach that destination; that, even though the *Peterhoff* was destined to Mexican waters, and the goods were there to be unladen, yet if they were to be transported thence by any mode of conveyance to the enemy's country, the trade was unlawful; that the trade in contraband goods with the enemy's country, through neutral territory, is likewise unlawful; that the goods so shipped through neutral territory, even though they may be unladen and transhipped, are liable to condemnation; that if the voyage of the *Peterhoff* was of such a character, it was an attempt to carry on trade with the enemy by the circuitous route of Mexican waters or a Mexican port, which the law will not countenance; that, under such circumstances, her voyage was illegal at its inception, and that she and the goods were liable to seizure at the instant it commenced.”§

Pretended neutral destination.

\* Castle, p. 71.

† Comp. Sec. 13, “Blockade.”

‡ Blatchford, Prize Cases, p. 507. The *Peterhoff*.

§ *Ibid.* p. 508.

"A prize court will not shut its eyes to a well-known and obvious system of conducting trade with the enemy in contraband articles."\*

"Every bill of lading of the cargo of the *Peterhoff* (and the thirty-nine bills of lading found on board covered the entire cargo) contains a provision that the goods are to be taken from alongside of the ship at the mouth of the Rio Grande within thirty days, in lighters, provided such lighters can cross the bar; and the stipulation on the part of the vessel in every bill of lading is to deliver the goods on the Rio Grande, in the Gulf of Mexico. After the lighters had crossed the bar and ascended the Rio Grande, which is the dividing line between the country of the enemy and Mexico, their freight might as well and as securely be delivered in the enemy's country on the left bank as in the Mexican territory on the right bank; and any transit of the goods through Matamoras on their way to Texas could not deprive the goods of the destination to the enemy's country originally intended for and impressed upon them. If a pretended neutral commerce of this character, enjoying such facilities for the introduction of contraband goods into the enemy's country, can be carried on without interference, and if the ostensible destination of a vessel on her papers to neutral waters at the mouth of the Rio Grande be sufficient, even when attended by all the circumstances which appear in evidence in this case in respect to the vessel and her cargo, to exempt both from seizure and condemnation, a very wide door will have been opened for the practice of fraud upon the belligerent rights of the United States; and the commerce of neutrals with the enemy, in supplying them with contraband articles, may go on in safety to an unlimited extent. The naked doctrine upon which this immunity is sought to be upheld is that whatever the character of the cargo, and whatever its ulterior destination, it is protected from lawful capture so long as the vessel on board of which it is laden is pursuing a voyage between neutral ports. The unsoundness of this doctrine has been fully demonstrated."†

Sec. 6. Occa-  
sional contra-  
band.

"The doctrine of occasional contraband or contraband according to circumstances is not sufficiently established to be regarded

\* Blatchford, *Prize Cases*, p. 510. The *Peterhoff*.

† *Ibid.* p. 545.

as a part of the law of nations. Naval stores and provisions are the articles which here come under our notice ; now, as these may form the principal exports of a nation, it is plain that by this rule the neutral's trade may be quite destroyed. The rule would thus be excessively harsh if the usual penalty hanging over contraband were inflicted. To mitigate this severity and in a certain sense to pacify neutrals, the British prize judges, especially Sir William Scott, adopted certain discriminating rules, according to which the articles in question partook more or less of the contraband character. Thus, if the produce of the country from which they had been exported, or in an unmanufactured state, or destined to a commercial port, they were viewed with greater indulgence than if shipped from a country where they were not grown, or in a manufactured state, or destined for a naval station."\*

Professor Woolsey is strongly opposed to the doctrine of occasional contraband, and says of an article of doubtful use : " It is either contraband or not, and is not so if there is a doubt to what class it belongs."

" Does usage sanction occasional contraband? So far as I can see, the most that can be said is, that belligerents have sometimes put doubtful articles into the list of contraband, and neutrals have sometimes submitted to it; but that no clear practice appears to have prevailed."†

" But one belligerent may prevent the other from obtaining direct military aid ; and goods of a certain description, bound into the country of the one, are so liable to become directly military aid that they may be intercepted by the other. This is the practical result of the conflict of the two forces of war and trade. In administering this law the question has arisen whether the belligerent is limited to an inspection into the intrinsic nature of the goods themselves, or may look further. It is agreed that a class of goods may be declared in their inherent nature exclusively or substantially of military use, and that these he may intercept without further inquiry. It is also agreed that there are goods not coming within that class, but which are capable of direct military as well as civil use, as to which their intrinsic nature alone ought not to furnish conclu-

Dana on occasional contraband.

\* Woolsey, Sec. 180.

† *Ibid.* 181.

sive proof in their favor. The question is, shall the fact of their ambiguous character stop or shall it open further inquiry? The weight of practice by belligerents or concessions by neutrals, and of the opinions of writers, has certainly hitherto been in favor of the latter course. If further inquiry shows that the owner intended to deliver them directly into military hands for military use, he loses them, not simply from their inherent contraband nature, but by reason of his own unneutral act. Although nothing be developed as to the owner's intent, yet if the condition of the port of destination or the character and state of the war make it satisfactorily appear that they will, in all probability, go directly into use or directly tend to relieve an enemy from hostile pressure, the right of the belligerent to intercept them may be exercised solely for those reasons. In such case it rests on his right to intercept aid to his enemy, though the act of the neutral carrier is not unlawful; and the captor, therefore, pays the neutral his freight."\*

Mr. Dana's views, given above, are fully in accord with the decisions of English and American prize courts, as shown in the preceding section, and the rule of contraband according to circumstances will in all probability be held by Great Britain and the United States when they are belligerents.

The most important articles at the present time subject to the rule of occasional contraband are provisions, and, in view of the great change which has taken place in naval architecture since the rule was formulated, coal and steam machinery. In making seizures of any of these articles, the naval officer will be, of course, guided not only by established practice, but by direct instructions from his government.†

**Provisions.** In discussing the question of classing provisions as contraband, Mr. Wheaton says of the treaty of 1794: "As to the 18th article of the treaty of 1794 between the United States and Great Britain, it manifestly intended to leave the question where it found it; the two contracting parties not being able to agree upon a definition of the cases in which provisions and other articles not generally contraband might be regarded as such (the American government insisting on confining it to articles destined to a place actually besieged, blockaded,

\* Dana's Wheaton, p. 634, *n*.

† Dahlgren, p. 92.

or invested, whilst the British government maintained that it ought to be extended to all cases where there is an expectation of reducing the enemy by famine), concurred in stipulating that 'whenever any such articles so becoming contraband, *according to the existing law of nations*, shall for that reason be seized, the same shall not be confiscated,' but the owners should be completely indemnified in the manner provided for in the article. When the law of nations existing at the time the case arises pronounces the articles contraband, they may for that reason be seized; when otherwise, they may not be seized. Each party was thus left as free as the other to decide whether the law of nations in the given case pronounced them contraband or not, and neither was obliged to be governed by the opinion of the other. If one party, on a false pretext of being authorized by the law of nations, made a seizure, the other was at full liberty to contest it, to appeal to that law, and if he thought fit, to resort to reprisals and war."\*

Wheaton seems, on the whole, to be opposed to classing provisions as contraband except when shipped for a besieged or blockaded place, but he quotes a case coming before the Supreme Court of the United States, in which the court seemed "disposed to adopt all the principles of Sir W. Scott as to provisions becoming contraband under certain circumstances."†

The position assumed by the United States in the negotiations resulting in the treaty of 1794 with Great Britain was maintained in the treaties with San Salvador and the United States of Colombia, referred to in a previous section.

"The doctrine of the English courts at the commencement of the present century with respect to provisions was that 'generally they were not contraband, but might become so under circumstances arising out of the particular situation of the war, or the conditions of the parties engaged in it.' Grain, biscuit, cheese, and even wine, when on their way to a port of naval equipment or to a naval armament, were condemned, and, as has already been seen, the same practice was followed by the courts of the United States.

"No nation except England has pushed its practice even to the point admitted in the American courts; nor can it be doubted for a moment, not only that the detention of provisions

\* Lawrence's Wheaton, p. 794.

† *Ibid.* p. 810.

The English doctrine as to provisions.



bound to a port of naval equipment is unauthorized by usage, but that it is unjustifiable in theory. To divert food from a large population when no immediate military end is to be served, because it may possibly be intended to form a portion of supplies which in almost every case an army or a squadron could complete from elsewhere with little inconvenience, would be to put a stop to all neutral trade in innocent articles. But writers have been satisfied with a broad statement of principle, and they have overlooked an exceptional and no doubt rare case, in which, as it would seem, provisions may fairly be detained or confiscated. If supplies are consigned directly to an enemy's fleet, or if they are sent to a port where the fleet is lying, they being in the latter case such as would be required by ships, and not ordinary articles of import into the port of consignment, their capture produces an analogous effect to that of commissariat trains in the rear of an army. Detention of provisions is almost always unjustifiable, simply because no certainty can be arrived at as to the use that will be made of them; so soon as certainty in fact is established, they, and everything else which directly and to an important degree contributes to make an armed force mobile, become rightly liable to seizure. They are not less noxious than arms; but except in a particular juncture of circumstances their noxiousness cannot be proved."\*

This seems a just statement of the case, and in determining whether the particular circumstances warrant the seizure of a cargo of provisions, the naval officer must be guided, as observed by Rear-Admiral Dahlgren with regard to articles of promiscuous use, by a "sound discretion as to their final destination."

Coal. The question of classing coal as contraband or free will assume increasing importance in future maritime wars, but it has so lately become essential in the movements of vessels and fleets that no usage can be considered fixed. Great Britain seems committed to the view that coal may easily be regarded as contraband, and the same may be said of the United States, except where the government is bound by fixed definitions in treaties. France has declared on two occasions, when a belligerent, that coal is not to be held as contraband; and this position is strongly supported by her writers.

\* Hall, pp. 583-4.

"Coal may, under the particular circumstances of the case, regard being had to its quality and destination, become liable to seizure."\*

"England, on the other hand, during the war of 1870, considered that the character of coal should be determined by its destination, and though she refuses to class it as a general rule with contraband merchandise, vessels were prohibited from sailing from English ports with supplies directly consigned to the French fleet in the North Sea. Germany went further, and remonstrated strongly against its export to France being permitted by the English government. The claim was extravagant, but the nation which made it is not likely to exclude coal from its list of contraband. The view taken by England seems to be that which is most appropriate to the uses of the commodity with which it deals. Coal is employed so largely and for so great a number of innocent purposes, the whole daily life of many nations is so dependent on it by its use for making gas, for driving locomotives, and for the conduct of the most ordinary industries, that no sufficient presumption of an intended warlike use is afforded by the simple fact of its destination to a belligerent port. But on the other hand, it is in the highest degree noxious when employed for certain purposes; and when its destination to such purposes can be shown to be extremely probable, as by its consignment to a port of naval equipment, or to a naval station, such as Bermuda, it is difficult to see any reason for sparing it which would not apply to gunpowder. One article is as essential a condition of naval offence as is the other."†

Position of the  
British Gov-  
ernment.

The British Foreign Office, in reply to an inquiry by certain British merchants as to what articles were to be considered contraband under the Queen's proclamation of May 13, 1859, issued with reference to the war between France, Sardinia and Austria, declined to give any definition of contraband, but said of coal: "The prize court of the captor is the competent tribunal to decide whether coal is or is not contraband of war, and it is obviously impossible for the government of Her Majesty, as a neutral sovereign, to anticipate the result of such decision. It appears, however, to Her Majesty's government that, having regard to the present state of naval armaments, coal

\* Phillimore, Vol. III, p. 361.

† Hall, p. 582.

may in many cases be rightly held to be contraband of war; and therefore all who engage in this traffic must do so at a risk from which Her Majesty's government cannot relieve them."\*

A more decided position was taken, in 1862, by the British government in instructions to colonial authorities looking to the preservation of neutrality. By those instructions coal was placed in the list of articles that cannot be furnished vessels of war of a belligerent consistently with the duties of a neutral—contraband of the most positive character. The same view was held by the government, as we have seen, in 1870.

Position of  
France.

While at war with Mexico in 1864, France complained of a refusal on the part of the United States to allow supplies of coal to be furnished her fleet, and characterized it as a departure from the traditional policy of our government. This refusal was admitted by Mr. Seward, and justified on the ground of observing neutrality between the parties to the war.†

Machinery.

Marine boilers and machinery and their parts, like coal, are not the subjects of any fixed usage, but, beyond any doubt, they will be classed as contraband in maritime warfare, even the writers who argue for a limited list of contraband articles admitting that they may become liable to seizure.

Pre-emption.

"The harshness of the doctrine of occasional contraband brought into favor the rule of pre-emption, which was a sort of compromise between the belligerents (if masters of the sea) and the neutrals. The former claimed that such articles may be confiscated, the latter that they should go free. Now, as the belligerent often wanted these articles, and at least could hurt his enemy by forestalling them, it came nearest to suiting both parties if, when they were intercepted on the ocean, the neutral was compensated by the payment of the market price and of a fair profit.

"This rule, which was more especially applied by the English prize courts shortly after the French revolution, would be a relaxation of the severe right of war, if the doctrine of occasional contraband could be established, and as such, a concession to neutrals. But it does not, as an independent rule, possess sufficient support from usage and authority.

\* Lawrence's Wheaton, p. 799, n.

† Diplomat. Corres., 1864, p. 115. Mr. Seward to Mr. Dayton, June 27, 1863.

"Such a rule, in a broad sense, would authorize, whether in war or peace, the taking of property from subjects or foreigners if self-preservation required it. A more limited necessity is contemplated in the passage of Grotius already cited, as pertaining to a belligerent, and justifying him in detaining the goods of those who are not enemies if otherwise he cannot defend himself. Omitting to inquire whether nations have any such right, which, if it exist, can arise only in extreme cases, we need only say that modern pre-emption is limited in extent to cargoes of neutrals bound to the enemy's ports, and is practised to distress the enemy, not to relieve an imminent distress of one's own.

"The English practice in cases of pre-emption is to pay a reasonable indemnification and a fair profit on the commodity intercepted, but not to pay the price which could be obtained in the enemy's ports."\*

Hall states the English practice to be an allowance of ten per cent. profit on the mercantile value of the merchandise.†

A decree of the French National Convention of May 9, 1793, ordained that provisions should be paid for at their price in the port for which they were bound, that freight should be allowed as stipulated in the charter party, and that compensation, as determined by the prize court, should be made for detention.‡ The English rule would seem to be the most reasonable.

"There can be no doubt that vessels adapted for purposes of war, and steam machinery for sea steamers, together or in parts, are absolutely contraband."§

Sec. 7. Vessels  
as contraband.

"Ships ready made and capable of use for purposes of war have not occupied the attention of treaty-making powers. Hübner declares them contraband. Heffter is of the same judgment."||

"The principle of considering the sale of ships of war to the enemy as contraband is strictly held, but its application has been restricted to cases in which no doubt existed as to the character of the vessel or the purpose for which it was intended to be sold."¶

\* Woolsey, Sec. 182. † Hall, p. 583. ‡ Woolsey, p. 460, *n.* 23.

§ Dahlgren, p. 92.

|| Woolsey, Sec. 179, *n.*

¶ Pratt, Law of Contraband, p. xxiv.

"The sale of a ship *for purposes of war* is the sale of the most noxious article of war. The sale by a neutral to a belligerent of any ship is a very suspicious act in the opinion of the English and North American prize courts, and one which the French prize courts refuse to recognize."\*

The following instructions were given to commanding officers of Spanish vessels blockading the ports of Chile in 1865: "You will also detain any neutral vessel which, by the construction of her hull or interior fitting, or other special circumstances, leaves no doubt of having been built for war, though with the appearance of a merchant vessel and cargo not contraband; since it might happen that such vessel had been built by private establishments for the enemy, or had been sent from a neutral port to be sold to the same; for in both cases such a vessel should be classed among contraband of war as an unquestionable means for that purpose."†

Dana on the sale  
of vessels of  
war.

In discussing neutral duties, Mr. Dana sums up as follows the principles affecting the sale of vessels to a belligerent for war purposes: "Our rules do not interfere with *bonâ fide* commercial dealings in contraband of war. An American merchant may build and fully arm a vessel, and supply her with stores, and offer her for sale in our own market. If he does any acts as an agent or servant of a belligerent, or in pursuance of an arrangement or understanding with a belligerent that she shall be employed in hostilities when sold, he is guilty. He may, without violating our law, send out such a vessel, so equipped, under the flag and papers of his own country, with no more force of crew than is suitable for navigation, with no right to resist search or seizure, and to take the chances of capture as contraband merchandise, of blockade, and of a market in a belligerent port. In such case the extent and character of the equipments is as immaterial as in the other class of cases. The intent is all. The act is open to great suspicions and abuse, and the line may often be scarcely traceable; yet the principle is clear enough. Is the intent one to prepare an article of contraband merchandise, to be sent to the market of a belligerent, subject to the chances of capture and of the market? Or, on the other hand, is it to fit out a vessel which shall leave our

\* Phillimore, Vol. III, p. 360.

† Admiral Pareja's "Order of blockade."



port to cruise, immediately or ultimately, against the commerce of a friendly nation? The latter we are bound to prevent. The former the belligerent must prevent. In the former case the ship is merchandise, under *bonâ fide* neutral flag and papers, with a port of destination, subject to search and capture as contraband merchandise by the other belligerent, to the risks of blockade, and with no right to resist search and seizure, and liable to be treated as a pirate by any nation, if she does any act of hostility to the property of a belligerent, as much as if she did it to that of a neutral. Such a trade in contraband a belligerent may cut off by cruising the seas and by blockading his enemy's ports."\*

The rules which govern the conduct of neutral States in cases of building and fitting out ships for a belligerent, and intended to serve directly for war purposes, will be treated of fully in a subsequent chapter on neutral rights and obligations.

"In order to hinder the transportation of *contraband* goods to an enemy, are we only to stop and seize them, paying the value to the owner, or have we a right to confiscate them? Barely to stop those goods would in general prove an ineffectual mode, especially at sea, where there is no possibility of entirely cutting off all access to the enemy's harbors. Recourse is therefore had to the expedient of confiscating all contraband goods that we can seize on, in order that the fear of loss may operate as a check on the avidity of gain, and deter the merchants of neutral countries from supplying the enemy with such commodities. And, indeed, it is an object of such high importance to a nation at war to prevent as far as possible the enemy's being supplied with such articles as will add to his strength and render him more dangerous, that necessity and the care of her own welfare and safety authorize her to take effectual methods for that purpose, and to declare that all commodities of that nature, destined for the enemy, shall be considered as lawful prize. On this account she notifies to the neutral States her declaration of war, whereupon the latter usually give orders to their subjects to refrain from all contraband commerce with nations at war, declaring that if they are captured in carrying on such trade, the sovereign will not

Sec. 8. Penalty  
for carrying  
contraband.

\* Dana's Wheaton, p. 563, n.

protect them. This rule is the point where the general custom of Europe seems at present fixed after a number of variations.

"The modern usage is certainly the most agreeable to the mutual duties of nations, and the best calculated to reconcile their respective rights. The nation at war is highly interested in depriving the enemy of all foreign assistance; and this circumstance gives her a right to consider all those, if not absolutely as enemies, at least as people that feel very little scruple to injure her, who carry to her enemy the articles of which he stands in need for the support of the war. She, therefore, punishes them by the confiscation of their goods. Should their sovereign undertake to protect them, such conduct would be tantamount to his furnishing the enemy with those succors himself—a measure which were undoubtedly inconsistent with neutrality."\*

Extent of penalty.

"In general, where the ship and cargo do not belong to the same person, the contraband articles only are confiscated, and the carrier-master is refused his freight, to which he is entitled upon innocent articles which are condemned as enemy's property. But where the ship and the innocent articles of the cargo belong to the owner of the contraband, they are all involved in the same penalty. And even where the ship and the cargo do not belong to the same person, the carriage of contraband under the fraudulent circumstances of false papers and false destination will work a confiscation of the ship as well as the cargo. The same effect has likewise been held to be produced by the carriage of contraband articles in a ship, the owner of which is bound by the express obligation of the treaties subsisting between his own country and the capturing country to refrain from carrying such articles to the enemy. In such a case it is said that the ship throws off her neutral character, and is liable to be treated at once as an enemy's vessel, and as a violator of the solemn compacts of the country to which she belongs."†

"The French *réglement* of the 26th of July, 1778, which is still in force, also confiscates both vessel and cargo when three-fourths in value of the cargo are contraband. This is only an internal law of France, not binding on other nations, and is sustained by no treaty."‡

\* Vattel, pp. 337-8. † Lawrence's Wheaton, pp. 806-9. ‡ *Ibid.* p. 807, n.

"The penalty of contraband extends to all the property of the same owner involved in the same unlawful transaction, and, therefore, if articles which are contraband and are going to the enemy are on board of the same vessel with articles which are not contraband, and all the articles belong to the same owner, all will be alike condemned, the innocent articles being affected with the contagion of the contraband articles."\*

Ortolan and Hautefeuille both oppose condemnation of the ship and innocent articles of the cargo under any circumstances, but they differ essentially as to the ground of condemnation of the contraband goods.

Ortolan holds, with Vattel, that "confiscation is a logical punishment, which flows from the very nature of things, and is proportioned to the gravity of the offence, since it reaches all prohibited articles, whether the quantity be great or small. To go further and confiscate the neutral vessel and the merchandise not prohibited would be to apply a punishment arbitrary and variable in its extent, falling often on the innocent, and unjustifiable even in the particular cases mentioned."†

Hautefeuille, on the other hand, disputes the power of a belligerent to inflict punishment on the subjects of a neutral sovereign, and says: "The power of the belligerent is not to punish the author of the act which injures him, but to prevent this act from being consummated, that the contraband should not be carried into the country of his enemy; to seize these articles when they are destined to the ports of his adversary. The secondary law, going further than the primitive law, has authorized him to confiscate the contraband, which he should only have detained. But the innocent articles, whether in greater or less quantity, of greater or less value, and the ship itself, are not dangerous to the belligerent; he has no right to take possession of them to prevent their going to their place of destination."‡

Several treaties made by the United States, now in force, <sup>Treaty stipulations.</sup> exempt from confiscation the ship and the innocent articles of the cargo, and even stipulate that the vessel shall be allowed to pursue her voyage on surrendering the contraband goods,

\* Blatchford, Prize Cases, p. 452. The Springbok.

† Ortolan, Vol. II, p. 187.

‡ Hautefeuille, Vol III, p. 234.

except where the quantity of such articles is so great that the captor cannot, without great inconvenience, take it on board ; in which case the vessel shall be sent to the nearest convenient and safe port of the captor for trial.\* These treaties are with Bolivia, 1858, Ecuador, 1839, Guatemala, 1849, Hayti, 1864, Mexico, 1831, renewed in 1848, San Salvador, 1850, Sweden and Norway, 1783, renewed in 1827, and United States of Colombia, 1846.

Similar agreements existed in treaties with Great Britain, 1794, France, 1800, and Brazil, 1828, but these treaties are now obsolete.

By the treaty with Prussia of 1799, continued in part by that of 1828, it was agreed that even articles directly contraband should not be confiscated. Vessels of either party, having contraband on board, may be stopped and detained as long as the belligerent judges necessary to protect himself from the effects of the delivery of the contraband to the enemy, but the neutral proprietors are to receive a reasonable compensation for the loss occasioned by the detention. Or the captor may take any or all the contraband merchandise for his own use, paying for it the market price at the port of destination. The treaty contains the same stipulation for the freedom of the vessel on delivery of the contraband to the captor, as found in the other treaties cited.†

Dana on surren-  
der of contra-  
band.

Mr. Dana says, in reference to the latter stipulation : " It is for the interest of the neutral carrier, if he knows that the goods claimed by the visiting cruiser are contraband, to give them up and be permitted to go on his way, rather than to be carried into the belligerent's port to await adjudication upon them. . . . This stipulation is common in the treaties between the United States and the other American republics. Hautefeuille contends for this as a right of a neutral by international law, by which, however, he means that it should be the neutral's right, by justice and reason, in the author's opinion. No national act in diplomacy, or based on adjudication, and independent of treaty, has been produced or suggested by the distinguished author in affirmance of such a right. It is to be observed that, as the captor must still take the cargo into port and submit it to adjudication, and as the neutral carrier cannot bind the owner

\* U. S. Treaties, 1873, " Bolivia," p. 86.

† *Ibid.* Prussia, pp. 719-27.

of the supposed contraband cargo not to claim it in port, the captor is entitled, for his protection, to the usual evidence of the ship's papers and whatever other evidence induced him to make the capture, as well as to the examination on oath of the master and supercargo of the vessel. It may not be possible or convenient to detach all these papers and deliver them to the captor, and certainly the testimony of the persons on board cannot be taken at sea in the manner required by law. Such a provision may be applicable to a case where the owner of the goods, or a person capable of binding him, is on board and assents to the arrangement, agreeing not to claim the goods in court, but not to a case where the owner is not bound. There may also be a doubt whether the ostensible owner or agent is really such; and so the captor may be misled. Indeed, a strong argument might be made from these considerations, that the article in the treaty can only be applied to a case where there is the capacity in the neutral vessel to insure the captor against a claim on the goods."\*

"In case of the delivery of the goods to the cruiser, equally as when the ship is sent into port, the validity of the seizure is to be decided by the proper tribunals. The articles are not to be deemed *prize* till condemned."†

"It is equally well settled that the inception of the voyage completes the offence; that, from the moment that the vessel, with the contraband articles on board, quits her port on the hostile destination, she may be legally captured; and that it is not necessary to wait until the ship and goods are actually endeavoring to enter the enemy's port; and that, the voyage being illegal at its commencement, the penalty immediately attaches, and continues to the end of the voyage, at least as long as the illegality exists."‡

"The general rule as to contraband articles, as laid down by Sir W. Scott, is that the articles must be taken *in delicto*, in the actual prosecution of the voyage to an enemy's port. 'Under the present understanding of the law of nations you cannot generally take the proceeds in the return voyage. From the moment of quitting port on a hostile destination, indeed, the offence is complete, and it is not necessary to wait till the goods

\* Dana's Wheaton, p. 665, *n.* † Lawrence, p. 809, *n.* See Prize, &c.

‡ Blatchford, Prize Cases, p. 412. The Stephen Hart.



are actually endeavoring to enter the enemy's port ; but beyond that, if the goods are not taken *in delicto*, and in the actual prosecution of such a voyage, the penalty is not now generally held to attach.' But the same learned judge applied a different rule in other cases of contraband, carried from Europe to the East Indies with false papers and false destination, intended to conceal the real object of the expedition, where the return cargo, the proceeds of the outward voyage, was held liable to condemnation."\*

In a note to the last paragraph quoted, Wheaton questions the soundness of the decision referred to, and says : " In order to sustain the penalty there must be, on principle, a *delictum* at the moment of seizure. To subject the property to confiscation whilst the offence no longer continues would be to extend it indefinitely, not only to the return voyage, but to all future cargoes of the vessel, which would thus never be purified from the contagion communicated by the contraband articles."

A case is reported in one of the English courts where an American vessel was condemned for the offence of carrying contraband, using false papers, after a lapse of three years, during which time several different voyages had been made.†

Sec. 9. Quantity of contraband allowed.

" It may be here noticed that in the case of an article, however noxious with reference to contraband, as, for instance, gunpowder itself, a moderate quantity would be considered as part of the ship's stores and intended for its use ; and this is not unfrequently provided for in treaties."‡

The treaty with Prussia, previously quoted, exempts from seizure the quantity of arms and their munitions necessary for the use of the ship, and that which every man serving on board the vessel or passenger ought to have.

Sec. 10. Carrying persons and despatches in the military service of the enemy.

" Of the same nature with the carrying of contraband goods is the transportation of military persons or despatches in the service of the enemy.

" A neutral vessel which is used as a transport for the enemy's forces is subject to confiscation, if captured by the opposite belligerent. Nor will the fact of her having been impressed by violence into the enemy's service exempt her. The master cannot be permitted to aver that he was an involuntary agent.

\* Lawrence's Wheaton, p. 809.

† Woolsey, p. 460.

‡ Lawrence's Wheaton, p. 797, n.

Were an act of force exercised by one belligerent power on a neutral ship or person to be considered a justification for an act, contrary to the known duties of the neutral character, there would be an end of any prohibition under the law of nations to carry contraband or to engage in any other hostile act. If any loss is sustained in such a service, the neutral yielding to such demands must seek redress from the government which has imposed the restraint upon him. As to the number of military persons necessary to subject the vessel to confiscation, it is difficult to define, since fewer persons of high quality and character may be of much more importance than a much greater number of persons of lower condition. To carry a veteran general, under some circumstances, might be a much more noxious act than the conveyance of a whole regiment. The consequences of such assistance are greater, and therefore the belligerent has a stronger right to prevent and punish it; nor is it material, in the judgment of the prize court, whether the master be ignorant of the character of the service on which he is engaged. It is deemed sufficient if there has been an injury arising to the belligerent from the employment in which the vessel is found. If imposition is practised it operates as force; and if redress is to be sought against any person, it must be against those who have, by means either of compulsion or deceit, exposed the property to danger; otherwise such opportunities of conveyance would be constantly used, and it would be almost impossible, in the greater number of cases, to prove the privity of the immediate offender.”\*

“ Assistance may be rendered to an enemy by a neutral in many other ways than by a supply of such material articles as have been already mentioned, particularly by the communication of information and orders from the belligerent government to its officers abroad, or the conveyance of military passengers. Such a proceeding is justly considered as being at variance with the duties of a neutral and contrary to the precepts of international law, and may not be inaptly termed *quasi contraband*.”†

Pratt on conveyance of military passengers.

“ It may perhaps be said that a soldier or two, like a package or two of contraband articles, might be overlooked; but it is held that to forward officers, especially of high rank, or even a single officer, would subject the neutral vessel to confiscation.

\* Dana's Wheaton, p. 630-5.

† Pratt, Law of Contraband, p. liv.

A modern case shows the rigor of the English courts in regard to such transportation. The Bremen ship *Greta* was condemned in 1855, during the Crimean war, by a prize court at Hong Kong, for carrying 270 shipwrecked Russian officers and seamen from a Japanese to a Russian harbor, although had this conduct been dictated by mere humanity, condemnation could not have taken place.”\*

“The fraudulently carrying the despatches of the enemy will also subject the neutral vessel in which they are transported to capture and condemnation. The consequences of such a service are indefinite, infinitely beyond the effect of any contraband that can be conveyed. ‘The carrying of two or three cargoes of military stores,’ says Sir W. Scott, ‘is necessarily an assistance of a limited nature, but in the transmission of despatches may be conveyed the entire plan of a campaign that may defeat all the plans of the other belligerent in that quarter of the world. . . . It is impossible to limit a letter to so small a size as not to be capable of producing the most important consequences. It is a service, therefore, which, in whatever degree it exists, can only be considered in one character—as an act of the most hostile nature. The offence of fraudulently carrying despatches in the service of the enemy being then greater than that of carrying contraband under any circumstances, it becomes absolutely necessary, as well as just, to resort to some other penalty than that inflicted in cases of contraband. The confiscation of the noxious article, which constitutes the penalty in contraband where the vessel and cargo do not belong to the same person, would be ridiculous when applied to *despatches*. There would be *no* freight dependent on their transportation, and therefore this penalty could not, in the nature of things, be applied. The vehicle in which they are carried must therefore be confiscated.’”†

Of the penalty inflicted on the neutral vessel for carrying hostile persons and despatches, Mr. Dana says: “The reason is that the neutral is engaged in the belligerent service of the enemy. This the other belligerent may prevent, and in order to prevent, may inflict adequate penalties to deter all others as well as to punish the offender. It is agreed by nations that the

\* Woolsey, Sec. 184.

† Dana’s Wheaton, p. 635-6.

penalty may be the condemnation of the vessel and of any property on board which the wrong-doer fairly represents.

"The question now becomes one of degree. What acts constitute such a service to the enemy as to entail condemnation? On this the safest guides are the decisions of prize courts adopted as the acts of nations, and the like national acts in the way of treaties and decrees or orders."\*

From several cases cited Mr. Dana deduces the following doctrines:

"(1) If a vessel is in the actual service of the enemy as a transport, she is to be condemned. In such case it is immaterial whether the enemy has got her into his service by voluntary contract or by force or fraud. It is also in such case immaterial what is the number of the persons carried or the quantity or character of the cargo; and, as to despatches, the court need not speculate upon their immediate military importance. It is also unimportant whether the contract, if there be one, is a regular letting to hire, giving the possession and temporary ownership to the enemy, or a simple contract of affreightment. The truth is, if the vessel is herself under the control and management of the hostile government, so as to make that government the owner *pro tempore*, the true ground of condemnation should be as *enemy's property*. The interpretation of this technical phrase of prize law will cover all such cases. Decisions of  
Prize Courts.

"(2) If a vessel is not in the enemy's service, still, if the master knowingly takes for the enemy's government or its agents persons or papers of such a character or destination that the transporting of them under the neutral flag is an actual belligerent service to the State, it is an unneutral act, which forfeits the vessel. If he avers ignorance of the character of the persons or papers, all the circumstances are to be considered for the purpose of determining not only the truth of his averment, but whether his ignorance, though real, is excusable. He is bound to a high degree of diligence in such cases, and if the circumstances fairly put him on inquiry, which he does not properly pursue, he will not be excused. Among these circumstances are the character of the despatch, as far as shown from itself, its source, its destination, the circumstances attending its delivery or custody, and the character of the ports of departure

\* Dana's Wheaton, p. 639, n.

and destination of the vessel, as being neutral or hostile. In a case of a vessel not in the enemy's service, but doing such acts for his benefit, can she be said to be enemy's property *pro hac vice*? In the *Tulip*, an American vessel, during the war with England, carrying despatches from a British minister to his own government from a neutral port under a safe-conduct, agreeing to put them on board some homeward-bound British vessel, was held to be, *pro hac vice*, enemy's property; but in that case the vessel, being American, was condemnable for traitorously aiding the enemy, and the form of condemnation was of little consequence.

"(3) It is not an unneutral intervention, entailing a penalty, for a neutral to knowingly carry a despatch of a character recognized as diplomatic in the international intercourse of States. Of this class is a despatch passing either way between the enemy's home-government and its diplomatic agent in a neutral country, or between a neutral government and its diplomatic agent in an enemy's country; and consuls-general come within the privilege of this rule. But if the despatches are placed in a private vessel of the nation with which the ambassador's nation is at war, and she is captured by a cruiser of the former nation, the despatches have no immunity.

"The above are the principles laid down by the English prize courts and adopted by the British government, which no other prize courts have overruled, and no national acts of other States, in the way of treaties and permanent orders, have disclaimed."\*

"If the ship-master is found guilty of carrying hostile despatches, the ship is liable to condemnation, and the cargo is confiscable also, both '*ob continentiam delicti*' and because the agent of the cargo is guilty. But if the master is not such an agent, his guilt will not extend beyond the vessel.

"This rule, in its general form, if not in its harsher features, may be said to have passed into the law of nations."†

It has been held by the courts of the United States that a neutral may carry despatches from a minister resident in the neutral State to a port of the belligerent country to which the minister belongs; if stopped at sea for the purposes of a search, his only obligation is to act candidly, and deliver the despatches to the enemy of the minister's government. "Concealment and

\* Dana's *Wheaton*, p. 643, *n*.

† Woolsey, *Sec.* 184.



*mala fides* are taking part with the enemy, and will subject the neutral to the penalties inflicted by the law of nations.”\*

“If a neutral who has been in the habit, in the way of his Mail steamers. ordinary business, of carrying post-bags to or from a belligerent port receives sealed despatches with other letters in the usual bags, or if he even receives a separate bundle of despatches without remuneration, he cannot be said to make a bargain with the belligerent, or to enter his service personally for belligerent purposes. He cannot even be said to have done an act of trade of which he knows that the effect will be injurious to the other belligerent; despatches may be noxious, but they may also be innoxious, and the mere handing over of despatches to him in the ordinary course of business affords him no means of judging of their quality. A neutral accepting despatches in this manner cannot therefore be subjected to a penalty. When again a neutral in the way of his ordinary business holds himself out as a common carrier, willing to transport everybody who may come to him for a certain sum of money from one specified place to another, he cannot be supposed to identify himself specially with belligerent persons in the service of the State who take passage with him. The only questions to be considered are whether there is any usage compelling him to refuse to receive such persons if they are of exceptional importance, and, consequently, whether he can be visited with a penalty for receiving them knowingly, and whether, finally, if he is himself free from liability, they can be taken by their enemy from on board his vessel.”†

As to the last question suggested in the above, it may be said that where the subject is touched upon at all in treaties, persons in the military service of the enemy are specially excepted from the protection afforded by the neutral flag to the persons and property of enemy subjects. The language generally used, after stipulating for the freedom of goods not contraband, is as follows: “It is also agreed, in like manner, that the same liberty be extended to persons who are on board a free ship; and they shall not be taken out of that free ship unless they are officers or soldiers, and in the actual service of the enemy.”‡

And, as illustrating the duty of the master of a neutral mail

\* Dahlgren, p. 145.

† Hall, p. 591.

‡ U. S. Treaties, 1873, Italy, p. 508.

steamer, sailing for an enemy's port, not to receive as passengers officers and men of the enemy's military service, the following case may be cited :

The British mail steamer *Teviot*, permitted to pass the blockade of Vera Cruz maintained by the United States in 1847, carried as a passenger from Havana to Vera Cruz General Paredes, previously President of Mexico. This was made the subject of complaint by the United States, and it was represented that according to the rules of English prize courts, as laid down by Sir Wm. Scott, the *Teviot* had been rendered liable to capture and condemnation. This was not insisted upon, but the punishment of the commander of the *Teviot* was asked in order that the disapproval of the British government might be shown.

The government, after an investigation of the affair, informed the directors of the company to which the *Teviot* belonged that they were bound to testify in a marked manner their disapproval of the conduct of the commander of the vessel, and he was in consequence suspended from his command ; and the company publicly and distinctly condemned any act on the part of their officers which might be regarded as a breach of good faith towards the United States.\*

In discussing the question of the right of taking military passengers out of neutral vessels, apparently implied by the language of treaties similar to that concluded with Italy in 1871, quoted above, Mr. Dana cites several proposals made by the United States to the government of Great Britain, in which this right was fully admitted, and says : " From the numerous treaties to which reference has been made, many in this century, and as late as 1851, and from these proposals of the great advocate of neutral rights and trade, a strong argument might be made in favor of a right to take military persons in actual service from neutral vessels without judicial proceedings against the vessels. Yet it is out of harmony with the practice of modern times in cognate cases. The proper rule would seem to be that, if there is no probable cause for thinking the vessel in fault in carrying them, and as no prize proceedings can be had against the persons, the persons should not be taken out of the vessel. But, if the case warranted proceedings against the

\* Lawrence's Wheaton, App. p. 959.

vessel on grounds of probable cause to believe her in fault, she should be brought in for proceedings, and the persons held as prisoners of war, on the responsibility of the State to the neutral flag, until the case is determined. Still it must be admitted that the subject is an embarrassing one, whether the right to take such persons be generally conceded, or be coupled with prize proceedings against the vessel, and seems to present a case for some special proceedings of a peculiar character, arranged by convention, on national guaranties.”\*

“Vessels not being subject to a penalty for carrying despatches in the way of ordinary business, packets of a regular mail line are exempted as of course; and merchant vessels are protected in like manner when, by municipal regulations of the country from the ports of which they have sailed, they are obliged to take on board all government despatches, or letters sent from the post-offices.

“The great increase which has taken place of late years in the number of steamers plying regularly with mails has given importance to the question whether it is possible to invest them with further privileges. At present, although secure from condemnation, they are no more exempted than any other private ship from visit; nor does their own innocence protect their noxious contents, so that their post-bags may be seized on account of despatches believed to be within them. But the secrecy and regularity of postal communication is now so necessary in the intercourse of nations, and the interests affected by every detention of a mail are so great, that the practical enforcement of the belligerent right would soon become intolerable to neutrals. Much tenderness would no doubt be shown in a naval war to mail vessels and their contents; and it may be assumed that the latter would be seized under very exceptional circumstances. France in 1870 directed its officers that ‘when a vessel subjected to visit is a packet-boat engaged in postal service, and with a government agent on board belonging to the State of which the vessel carries the flag, the word of the agent may be taken as to the character of the letters and despatches on board’; and it is likely that the line of conduct followed on this occasion will serve as a model to other belligerents. At the same time it is impossible to overlook the fact

\* Dana’s Wheaton, p. 659, *u.*

that no national guarantee of the innocence of the contents of a mail can really be afforded by a neutral power. No government could undertake to answer for all letters passed in the ordinary manner through its post-offices. To give immunity from seizure as of right to neutral mail-bags would therefore be equivalent to resigning all power to intercept correspondence between the hostile country and its colonies, or a distant expedition sent out by it; and it is not difficult to imagine occasions when the absence of such power might be a matter of grave importance.

"No usage has hitherto formed itself on the subject. During the American Civil War it was at first ordered by the government of the United States that duly authenticated mail-bags should either be forwarded unopened to the foreign department at Washington, or should be handed after seizure to a naval or consular authority of the country to which they belonged, to be opened by him, on the understanding that documents to which the belligerent government had a right should be delivered to it. On the suggestion of the English government, which expressed its belief 'that the government of the United States was prepared to concede that all mail-bags, clearly certified to be such, should be exempt from seizure or visitation,' these orders were modified; and the naval officers were directed, in case of capture of vessels carrying mails, to forward the latter unopened to their destination."\*

The Trent  
affair.

The question, can persons other than those in the actual military service of a belligerent ever be taken out of neutral vessels, received a very thorough discussion in the Trent affair, and that case may be regarded as settling the question finally in the negative.

The circumstances are so well known that they need not be given at length here. The case resolved itself into the broad question, has the belligerent the right to take from a neutral vessel, under any circumstances, the persons of enemies not in the military service? Widely different views were at first held by the authorities of the United States and Europe; the statesmen and text-writers of Europe, without exception, condemning the action of Captain Wilkes in taking Messrs. Mason and Slidell out of the Trent; while the American writers were

\* Hall, p. 595. Mr. Seward's letter to Mr. Welles, Oct. 31, 1862.

almost unanimous in sustaining his action as being authorized by principles of international law.

Mr. Welles, the Secretary of the Navy, even went so far as to write Captain Wilkes, congratulating him on the "great public service he had rendered in the capture of the rebel emissaries," cautioning him, however, that his forbearance in not sending the Trent into port for trial before a prize court "must not be permitted to constitute a precedent hereafter for infractions of neutral obligations."

On the demand of the British government the Confederate commissioners were, with their secretaries, restored to the protection of the English flag, and the affair terminated peaceably, although it had nearly involved the two nations in war.

"It is believed that for the opposite conclusions arrived at by American and Continental jurists there is a ready solution in the former basing their arguments on the authority of adjudications, ever heretofore recognized as binding interpretations of the law of nations, both by the Admiralty Courts of the United States and of England; while the statesmen of France and of other powers who proffered their counsels relied on those theoretical principles which, equally with them, we have desired to see incorporated into the code of international law, but which can only be obligatory when sanctioned by conventions, which England has ever refused to enter into with us."\*

"This celebrated case can be considered as having settled but one principle, and that had substantially ceased to be a disputed question; viz., *that a public ship, though of a nation at war, cannot take persons out of a neutral vessel at sea, whatever may be the claim of her government on those persons.* It is to be borne in mind that Earl Russell, in his demand, makes no reference to the diplomatic character of Mason and Slidell, or to any special right of exemption in this case. He presents the naked case that a United States ship of war had taken persons from an innocent British neutral vessel at sea. To his reclamation against such a proceeding the United States were only too glad to assent; considering it as a triumph of their own principles, secured by their own decision, made against a strong national feeling in the particular case on the demand of the only power that had ever contended for the opposite doctrine.

Dana on the  
Trent affair.

\* Lawrence's Wheaton, App. p. 948.



"Beyond this the Trent case settles nothing. Mr. Seward considered the persons to be contraband of war from the nature of their office and the position of the power they assumed to represent. This was denied by Earl Russell, and left unsettled. Mr. Seward considered that the *termini* of the voyage of the Trent were immaterial, as the destination of the persons was certain, and she knowingly took them on their way. Earl Russell contends that the neutral *termini* were conclusive in her favor; and this was left unsettled. Earl Russell claimed for private mail-vessels no immunity, but only a more careful consideration. Mr. Seward restores the persons on the ground that, if a captor relinquishes his prize without necessity, he cannot take persons or cargo out of her as contraband—a principle well established in the law of nations. But the ground on which the British government put their demand—that persons could not be taken out of a neutral vessel by a belligerent, whatever the claim upon them—must be considered as settling that doctrine in favor of the historical American position, as there is now no nation to call it into question."\*

Lord Russell's  
answer to Mr.  
Seward.

Mr. Hall says of Lord Russell's despatch to Lord Lyons of January 23, 1862: "He denied that the capture of Messrs. Mason and Slidell was simply irregular in its incidents, and maintained that they were not liable to capture at all; but he rested the immunity which he claimed for them on the privilege of receiving diplomatic agents from belligerent States accorded by the practice of nations to neutral States, and on the necessity that contraband articles shall have a hostile, and not a neutral destination; he even seems, by quoting, without comment, a passage from Bynkershoek, in which soldiers are classed with arms and other articles of use in war, to favor the view that at least persons who are in the military service of the State may be treated as contraband.

"It is to be regretted that Lord Russell did not address himself to the refutation of the doctrine that persons can be contraband of war. For the reasons mentioned above, however, there need be no hesitation in rejecting it. In the words of Mr. Bernard, 'it is incorrect to speak of the conveyance of persons

\* Dana's Wheaton, p. 648, *n.* See also for a full discussion of this case, with opinions of Continental writers, App. to Lawrence's Wheaton, p. 939.

in the military or civil employment of a belligerent as if it were the same thing as the conveyance of contraband of war, or as if the same rules were applicable to it. It is a different thing, and the rules applicable to it are different.' If a vessel is so hired by a belligerent that he has entire control over it to the extent of his special needs, the ship itself is confiscable as having acquired an enemy character, and the persons on board become prisoners of war. If, on the other hand, belligerent persons, whatever their quality, go on board a neutral vessel as simple passengers to the place whither she is in any case bound, the ship remains neutral, and covers the persons on board with the protection of her neutral character."\*

Before accepting this last statement it would be well to consider the effect of allowing neutral mail-steamers the privilege of carrying as passengers the enemy's officers and men to and from their home ports—cases of which would be very likely to occur in modern war. Access to ports under blockade even is generally permitted to mail-steamers at present, and such a privilege as is claimed for them above would be exceedingly dangerous to a belligerent, and is not likely to be conceded by any nation engaged in war.

The present usage among nations is for neutral governments to issue proclamations notifying their subjects of the existence of a state of war, and warning them against rendering any service to either belligerent, or engaging in contraband trade, which they then do at their own risk. But it is not held to be the duty of neutral governments to take any measures to prevent trade with a belligerent in contraband goods. The responsibility of preventing such trade rests with the injured belligerent, and he is invested with power by the law of nations to inflict punishment for offences committed against him by neutral individuals.

"It is not the practice of nations to undertake to prohibit their own subjects, by previous laws, from trafficking in articles contraband of war. Such trade is carried on at the risk of those engaged in it, under the liabilities and penalties prescribed by the law of nations or particular treaties. If it be true, therefore, that citizens of the United States have engaged in a commerce by which Texas, an enemy of Mexico, has been supplied

Sec. 11. Duties  
of neutrals as  
to contraband.

\* Hall, pp. 599-600.

with arms and munitions of war, the government of the United States, nevertheless, was not bound to prevent it, could not have prevented it without a manifest departure from the principles of neutrality, and is in no way answerable for the consequences. . . . . The 18th article (of the treaty between the United States and Mexico) enumerates those commodities which shall be regarded as contraband of war, but neither that article nor any other imposes on either nation the duty of preventing, by previous legislation, commerce in such articles. Such commerce is left to its ordinary fate according to the law of nations."

The above opinion of Mr. Webster, quoted by Mr. Lawrence, was cited in Parliament by the Solicitor General in February, 1862, and the principle laid down in it adopted by the government of Great Britain. Mr. Layard said, in reference to contraband trade carried on by British subjects, and after quoting the Foreign Enlistment Act of Great Britain: "That act does not touch in any way whatever private merchant vessels, which may carry cargoes, contraband or not contraband, between this country, or any of the dominions of Her Majesty, and any port in a belligerent country, whether under blockade or not; and the government of this country and the governments of our colonial possessions have no power whatever to interfere with private vessels under such circumstances.

"It is perfectly true that in the Queen's proclamation there is a general warning at the end, addressed to all the Queen's subjects, that they are not, either in violation of their duty to the Queen as subjects of a neutral sovereign, or in violation or contravention of the law of nations, to do various things, one of which is carrying articles considered and deemed to be contraband of war, according to law or the modern usages of nations, for the use and service of either of the contending parties. That warning is addressed to them to apprise them that if they do these things they will have to undergo the penal consequences by the statute or by the law of nations in that behalf imposed or denounced. In those cases in which the statute is silent the government are powerless and the law of nations comes in.

"The law of nations exposes such persons to have their ships seized and their goods taken and subjected to confiscation, and it further deprives them of the right to look to the government of their own country for any protection. And this principle of

non-interference in things which the law does not enable the government to deal with, so far from being a violation of the duty of neutrality—which the government are sincerely anxious to comply with—is in accordance with all the principles which have been laid down by jurists, and more especially by the great jurists of the United States of America.”\*

Some writers question the propriety of the neutral government limiting its action to a mere warning against contraband trade, and would make it one of the duties of neutrality to prevent it altogether.

Phillimore holds that articles of contraband cannot lawfully be sold to a belligerent even within the territory of the neutral State. “If it be the true character of the neutral to abstain from every act which may better or worsen the condition of a belligerent, the unlawfulness of any such sale is a necessary conclusion from these premises. For what does it matter where the neutral supplies one belligerent with the means of attacking another? How does the question of the locality, according to the principles of eternal justice and the reason of the thing, affect the advantage to one belligerent or the injury to the other accruing from this act of the alleged neutral?”†

Phillimore on  
sale of con-  
traband  
goods.

He would place the sale of contraband to a belligerent, then, on the same footing with enlisting in his service.

Professor Woolsey states the general rule of non-interference with contraband trade by neutral governments, but says: “All admit that when the act of exportation from the neutral territory begins, an act of violation of neutrality on the part of some one commences. The question may still be asked whether the government of the neutral is not bound to interfere when it has evidence that its subjects are thus aiding a belligerent against a friend, and is not bound also to acquaint itself with such evil intentions. In the present state of the law of nations this is not felt to be obligatory, although such trade is immoral, and tends to produce lasting national animosities. A juster and humaner policy would make all innocent trade with the enemy free, and require a neutral to pass stringent and effectual laws against contraband trade.”‡

\* Lawrence's Wheaton, pp. 813-14, n.

† Phillimore, Vol. III, Secs. 230-233.

‡ Woolsey, Sec. 178.

“A neutral merchant ought not to forget that the duties which the law of nations imposes on him flow from the same principle which ought to control the action of his government as a neutral government ; that, where he supplies to the enemy of a belligerent munitions or other articles contraband of war, or relieves, with provisions or otherwise, a blockaded port, he makes himself personally a party to a war in which, as a neutral, he has no right to engage ; that, under such circumstances, his property is justly treated as the property of an enemy ; and that the observance of those rules which the law of nations prescribes for his conduct is a high moral duty.”\*

\* Blatchford, Prize Cases, p. 412. The Stephen Hart.



## PART VI.

### THE RIGHT OF SEARCH.

No duty entrusted to a naval officer is more delicate than the exercise of the belligerent right of search. To avoid all just cause of offence to the neutral, and at the same time to take measures necessary to protect the interests of his government, requires sound judgment, with a due consideration for the rights and feelings of others. Under any circumstances the exercise of this right will be felt as an annoyance by the neutral, and it is the duty of the officer enforcing it to make this annoyance as little as possible, while insisting upon obtaining its full ends.

Sec. 1. Origin of the right.

The right itself rests upon the necessity of self-preservation; and although its exercise has sometimes been questioned by neutrals, and efforts made to resist it, as by the conventions of armed neutrality of the Northern European nations in 1780 and 1801, such efforts have not been successful, and the right of search is to-day regarded as one of the unquestioned principles of international law.

“In order to enforce the rights of belligerent nations against the delinquencies of neutrals, and to ascertain the real as well as the assumed character of all vessels on the high seas, the law of nations arms them with the practical power of visitation and search. The duty of self-preservation gives to belligerent nations this right. It is founded upon necessity, and is strictly and exclusively a war right, and does not rightfully exist in time of peace, unless conceded by treaty. All writers upon the law of nations, and the highest authorities, acknowledge the right in time of war as resting on sound principles of public jurisprudence, and upon the institutes and practice of all great maritime powers.”\*

“The right of visitation and search of neutral vessels at sea is a belligerent right, essential to the exercise of the right of

Importance of this right.

\* Kent, p. 159.

capturing enemy's property, contraband of war, and vessels committing a breach of blockade. Even if the right of capturing enemy's property be ever so strictly limited, and the rule of *free ships free goods* be adopted, the right of visitation and search is essential, in order to determine whether the ships themselves are neutral, and documented as such, according to the law of nations and treaties; for, as Bynkershoek observes, 'it is lawful to detain a neutral vessel in order to ascertain, not by the flag merely, which may be fraudulently assumed, but by the documents themselves on board, whether she is really neutral.' Indeed, it seems that the practice of maritime captures could not exist without it. Accordingly the text-writers generally concur in recognizing the existence of this right.

"The international law on this subject is ably summed up by Sir W. Scott, in the case of the *Maria*, where the exercise of the right was attempted to be resisted by the interposition of a convoy of Swedish ships of war. In delivering the judgment of the High Court of Admiralty in that memorable case, this learned civilian lays down the three following principles of law:

"1. That the right of visiting and searching merchant ships on the high seas, whatever be the ships, the cargoes, the destinations, is an incontestable right of the lawfully commissioned cruisers of a belligerent nation.

"2. That the authority of the neutral sovereign being forcibly interposed, cannot legally vary the rights of a lawfully commissioned belligerent cruiser. 'The only security known to the law of nations upon this subject, independently of all special covenant, is the right of personal visitation and search, to be exercised by those who have the interest in making it.'

"3. That the penalty for the violent contravention of this right is the confiscation of the property so withheld from visitation and search."\*

Sec. 2. Extent  
of this right.

The agreement among text-writers as to the right of search extends no further than its bare existence, a wide difference being found in their opinions as to the objects to be attained and the extent to which a search may be carried.

"The right of search is by its nature confined within narrow limits, for it is merely a method of ascertaining that certain specific violations of right are not taking place, and would

\* Dana's Wheaton, p. 689.

otherwise be a great violation itself of the freedom of passage on the common pathway of nations.

"*In the first place*, it is *only a war right*. The single exception of this is that a nation may lawfully send a cruiser in pursuit of a vessel which has left its port under suspicion of having committed a fraud upon its revenue laws or some other crime. This is merely the continuation of a pursuit beyond the limits of maritime jurisdiction with the examination conducted outside these bounds, which, but for the flight of the ship, might have been conducted within. *In the second place*, it is applicable to merchant ships alone. Vessels of war, pertaining to the neutral, are exempt from its exercise, both because they are not wont to convey goods, and because they are, as a part of the power of the State, entitled to confidence and respect. If a neutral State allowed or required its armed vessels to engage in an unlawful trade, the remedy would have to be applied to the State itself. To all this we must add that a vessel in ignorance of the public character of another, for instance, suspecting it to be a piratical ship, may without guilt require it to lie to, but the moment the mistake is discovered all proceedings must cease. *In the third place*, the right of search must be exerted in such a way as to attain its object, and nothing more. Any injury done to the neutral vessel or its cargo, any oppressive or insulting conduct during the search, may be good ground for a suit in the court to which the cruiser is amenable, or even for interference on the part of the neutral State to which the vessel belongs."\*

Rear-Admiral Dahlgren says of the objects and extent of the right of search: Dahlgren on  
extent of  
search,

"There are several purposes, all external and relating to things international—equality of independent flags—as to which no definition is agreed on, but varying, and the subject of question and dispute, ending even in war.

"1st. Examination of papers to prove nationality only.

"2d. Examination of papers to prove cargo and lawfulness of voyage.

"3d. Examination of the ship in continuation of the same purpose, or really search.

"The French *visite* may mean any or all of these, even the

\* Woolsey, Sec. 190.

greatest; while the English 'visit' and 'search' may extend no further than the least. Wheaton pronounces them equivalent.

"The Spanish Admiral Pareja described exactly the meaning of *visitar*, and included only the examination of papers, and that in a limited sense, except in certain cases."\*

Hautefeuille on  
the difference  
between visit  
and search.

Hautefeuille makes a distinction between "visit" and "search," confining the first to a simple inspection of the ship's papers, showing the nationality, voyage and cargo, and says that all the requirements of the belligerent arising from considerations of self-defence are satisfied when the regularity of those papers is established. He considers the actual search of a ship an act of jurisdictional authority, to be exercised only by the government to which the vessel belongs, and, as such, denied to the belligerent. No means, he says, should be used to discredit the official papers found on board, such as opening hatches and interrogating the crew.†

This doctrine is not accepted by English and American Prize Courts, they holding the right of the belligerent to carry the examination beyond the papers if any reason is discovered to doubt their correctness.

Decision in case  
of the Spring-  
bok.

"Naturally, the first object of the visitation and search of a neutral vessel by a belligerent cruiser is to examine the ship's documents and papers, and to ascertain her nationality, her port of departure, her destination, her lading, and the evidences of its character and ownership, so far as those particulars are determined by the papers on board. The next step is, if circumstances of a suspicious bearing are discovered, indicating her employment to be in violation of good faith and honest neutrality, to seize the vessel and cargo and submit them to adjudication before a prize court of the belligerent power which makes the arrest. This right is conceded and exercised by all maritime nations in time of war, in respect to the transportation by sea of contraband of war. . . . It will also be found that the right of search may be made effective by an examination of the lading as well as the papers of the vessel, restrained always within the limits of a fair and reasonable reserve."‡

Sec. 3. Manner  
of conducting  
search.

Mr. Seward, under date of August 8, 1862, wrote to Mr. Welles, Secretary of the Navy: "It is the duty of the naval

\* Dahlgren, p. 100.

† Hautefeuille, Vol. III, titles XI-XII.

‡ Blatchford, Prize Cases, p. 352. The Springbok.

officers to be vigilant in searching and seizing vessels, of whatever nation, which are carrying contraband of war to the insurgents of the United States; but it is equally important that the provisions of the maritime law, in all cases, be observed and respected. I am directed by the President to ask you to give the following instructions, explicitly, to the naval officers of the United States, namely :

“First. That under no circumstances will they seize any foreign vessel within the waters of a friendly nation.

“Second. That in no case are they authorized to chase and fire at a foreign vessel without showing their colors and giving her the customary preliminary notice of a desire to speak and visit her.

“Thirdly. That when the visit is made, the vessel is not then to be seized without a search, carefully made, so far as to render it reasonable to believe that she is engaged in carrying contraband of war to the insurgents and to their ports, or otherwise violating the blockade; and that if it shall appear that she is actually bound and passing from one friendly or so-called neutral port to another, and not bound or proceeding to or from a port in the possession of the insurgents, then she cannot lawfully be seized.

“And, finally, that official seals or locks or fastenings of foreign authorities are in no case, nor under any pretext, to be broken, or parcels covered by them read by any naval authorities of the United States; but all bags or other things carrying such parcels, and duly sealed or fastened by foreign authorities, will be, in the discretion of the United States officer to whom they may come, delivered to the consul, commanding naval officer, or legation of the foreign government, to be opened upon the understanding that whatever is contraband or important as evidence concerning the character of a captured vessel will be remitted to the prize court or to the Secretary of State at Washington, or such sealed bags or parcels may be at once forwarded to this Department, to the end that the proper authorities of the foreign government may receive the same without delay.

“The President desires especially that naval officers may be informed that the fact that a suspected vessel has been indicated to them as cruising in any limits which have been prescribed to them by the Navy Department, does not in any way authorize



them to depart from the rules of visitation, search and capture prescribed by the law of nations."

These instructions were so far modified subsequently as to authorize forwarding all mail-bags to their proper destination at once. They are now embodied in the United States Navy Regulations.\*

Directions for  
search by Ad-  
miral Pareja,  
1865.

The following directions for conducting visitation and search were given in the order of blockade of the Spanish Admiral Pareja in 1865, in the Pacific, and are more explicit even than the instructions above quoted :

" 1. On deciding to board and examine a merchant vessel, you will hoist the national ensign and fire an unshot gun, on which intimation the merchant vessel should heave to and await the boarding party with her colors hoisted. If she does not, you will manœuvre so as to compel her to do so.

" 2. If the merchant vessel heaves to at once and shows her flag, you will keep at such distance from her as you may deem convenient, according to the state of the wind and sea, or other circumstances not possible to foresee, and keeping in view always the safety of the boat sent to board.

" 3. As soon as the merchant vessel heaves to you will send a small boat with an officer, who, accompanied by only two or three men, will go on board and proceed to verify the nationality, the class and the cargo of the vessel, and whether engaged or not in illegal commerce ; that is, carrying any contraband of war. For which purpose the officer will require the captain to exhibit his sea-letter or passport, crew-list and bill of health from port of departure, by means of which he can ascertain the nationality of the vessel and the lawfulness of her voyage.

" If from this scrutiny it shall appear that the vessel visited is neutral, and is also bound to a neutral port, the examination is finished, and the officer is to leave the vessel at liberty, without inquiry into the nature of her cargo, endorsing her papers accordingly.

" If the vessel boarded should be bound to a port of the enemy, the officer, besides examining the papers already named, must demand of the captain those which prove the character of the cargo ; and if it appears from these that there is no contraband on board, the examination is terminated and the vessel at

\* Regulations, 1876, p. 135.

liberty, endorsed as already indicated. But if the papers show that there is contraband on board, you will take possession of the vessel, taking care, however, even in the latter case, that the hatches are not to be opened, nor closets nor chests, in order to see if there be other suspicious papers or merchandise.

"I must here repeat the caution given you previously, that the examination of a ship's papers is of the utmost importance, since they constitute the foundation on which depends the validity or invalidity of the capture.

"If in consequence of this examination the vessel becomes a prize, the officer will take possession of all her papers, giving to the captain a receipt therefor, and will cause him to make sail so as to approach the boarding vessel, which will then return to her station."

Existing treaties of the United States contain the following directions in regard to exercising the right of search:

Sec. 4. Treaties  
of the United  
States.

The treaty with Algiers, 1816, permits two persons only to go on board the neutral vessel to make the examination, and confines this to verification of the ship's papers showing nationality.\*

The same stipulations are found in the treaties with Tripoli, 1805, and Tunis, 1824. Nothing is said in any of the above treaties as to voyage and cargo of the vessel that may be visited.

The treaty with Bolivia, 1858, requires the vessel of war making the visit to remain at a convenient distance, and to send a boat, with two or three men only, to make an examination of the papers concerning the ownership and cargo of the vessel. The neutral master is not to be required to go on board the examining vessel to exhibit his papers or for any other purpose. The same stipulations are contained in the treaties with the Dominican Republic, 1867, Hayti, 1864, and Italy, 1871.

The treaty with the United States of Colombia, 1846, contains the same agreement as to the number of persons to be allowed on board, but requires the examining vessel to remain out of cannon-shot, unless in stress of weather. The same language is used in the treaties with Ecuador, 1839, Guatemala, 1849, Mexico, 1848, San Salvador, 1850, Spain, 1795, and Holland, 1782.

Distance to be  
kept by board-  
ing vessel.

\* U. S. Treaties, 1873, "Algiers," p. 20. See Tunis, Tripoli, Bolivia, Italy, &c.

The treaties with Prussia, 1828, and Morocco, 1836, say nothing of the distance at which the examining vessel shall remain, but contain the same stipulations otherwise as to number of persons allowed to go on board.

The treaty with Sweden and Norway, 1827, requires the vessels of each party to be furnished with sea-letters and manifests of cargo, which must be exhibited when demanded, but nothing is said of the manner of boarding. Opening hatches or boxes or any packages, until the cargo is landed in presence of officers appointed by a court, is prohibited.

Other treaties made by the United States, containing stipulations regulating the right of search, are obsolete. All others are silent on this subject.

Injuries and violence prohibited.

All treaties regulating the right of visitation and search provide for compensation for unjust detention, prohibit any violence, extortion, or insult offered to persons on board the neutral vessel, and prescribe punishment for violations of this stipulation.

Rear-Admiral Dahlgren says of the treaty agreements of the United States: "Thus the political course of our government has bound the United States to the utmost restriction that neutral interests could ask for in prosecuting the search for contraband, as far as Spain, Holland, Sweden and Prussia are concerned, and the American States. The most important interests are left to depend on the honesty of mere sets of papers, whose very signatures our officers are unacquainted with. Contraband may lie beneath every hatch, under the guise of 'hardware' on the manifests and certificates, according to the common practice during the war of the rebellion. But all examination of the fact by the captor is forbidden."\*

Sec. 5. Search on suspicion of piracy and to suppress the slave trade.

"The inter-visitation of ships at sea is a branch of the law of self-defence, and is, in point of fact, practised by the public vessels of all nations, including those of the United States, when the piratical character of a vessel is suspected. The right of visit is conceded for the sole purpose of ascertaining the real national character of the vessel sailing under suspicious circumstances, and is wholly distinct from the right of search. It has been termed by the Supreme Court of the United States the

\* Dahlgren, p. 104.

*right of approach* for that purpose, and it is considered to be well warranted by the principles of public law and the usages of nations."\*

"Even public vessels suspected of piracy may be called to account upon the ocean. Whether the detention of a vessel unjustly suspected of piracy may not be a ground for a claim of damages may be made a question."†

"*The neutral right of visitation and search*, in reference to the slave trade, has even been conceded by the European governments of Austria, France, Great Britain, Prussia and Russia, who were parties to the Quintuple Treaty at London, of December, 1841. This treaty was subsequently ratified by all the contracting parties except France, who remained bound only to a restrictive right of search under the conventions of 1831 and 1833."‡

This reciprocal right of search of vessels suspected of employment in the slave trade has been agreed to by treaty between the United States and Great Britain, but within certain defined limits only, and with the sole purpose of suppressing that trade.

The treaty of 1862, with its additional article of February 17th, 1863, allows the vessels of either country, under suspicion of being engaged in the slave trade, to be searched and detained, or sent into certain ports for trial, by the cruisers of the respective governments that are provided with the special instructions for such duty required by the treaty. The right thus conceded can be exercised only within two hundred miles of the African coast, south of the thirty-second parallel of north latitude, and within thirty marine leagues of the coasts of Cuba, Puerto Rico, San Domingo and Madagascar.§ Treaty of 1862.

"It is admitted by all that within the waters which may be called the territory of nations, as within a marine league, or in creeks and bays, the vessel of a friendly State may be boarded and searched on suspicion of being engaged in unlawful commerce or of violating the laws concerning revenue. But further than this, on account of the ease with which a criminal may escape beyond the proper sea-line of a country, it is allowable Sec. 6. Municipal right of search.

\* Kent, p. 160, n.

† Woolsey, Sec. 195.

‡ Kent, p. 160, n.

§ U. S. Treaties, 1873, "Great Britain," pp. 390-402.

to chase such a vessel into the high sea, and then execute the arrest and search which flight had prevented before. Furthermore, suspicion of offences against the laws, taking their commencement in the neighboring waters beyond the sea-line, will authorize the detention and examination of the supposed criminal.”\*

Sec. 7. Resistance to search.

“It is plain, from the reality of the right of search, that an obligation lies on the neutral ship to make no resistance. The neutral is in a different relation to the belligerents than the vessels of either of them to the other. These can resist, can run away, unless their word is pledged, but he cannot. Annoying as the exercise of this right may be, it must be submitted to, even as innocent persons are bound to submit to a search-warrant for the sake of general justice. Any resistance, therefore, or attempt to escape, or to get free from the search or its consequences, by force, if they do not bring on the destruction of the vessel at the time, may procure its confiscation, even though it had been engaged in a traffic entirely innocent.”†

Sir William Scott said, in the decision already quoted: “But I stand with confidence upon all principles of reason—upon the distinct authority of Vattel—upon the institutes of other great maritime countries, as well as those of our own country, when I venture to lay it down that by the law of nations, as now understood, a deliberate and continued resistance to search, on the part of a neutral master, to a lawful cruiser, is followed by the legal consequence of confiscation.”

Resistance made by convoy.

“In the case of the *Maria* the resistance of the convoying ship was held to be a resistance of the whole fleet of merchant vessels under convoy, and subjected the whole to confiscation. This was a case of neutral property condemned for an attempted resistance by a neutral armed vessel to the exercise of the right of visitation and search by a lawfully commissioned belligerent cruiser. But the forcible resistance by an enemy master will not, in general, affect neutral property laden on board an enemy’s merchant vessel; for an attempt on his part to rescue his vessel from the possession of the captor is nothing more than the hostile act of a hostile person, who has a perfect right to make such an attempt.”‡

\* Woolsey, Sec. 194.

† *Ibid.* Sec. 190.

‡ Lawrence’s Wheaton, p. 855.



"Capture of a vessel takes place—

"1. When visit and search are resisted.

Sec 8. When capture takes place.

"2. When it is either clear or there is fair ground for suspecting, upon evidence obtained by the visit, that the vessel is engaged in an illicit act, or that its cargo is liable to confiscation.

"3. When from the absence of essential papers the true character of the ship cannot be ascertained."\*

The exemption of vessels under convoy from visitation and search cannot be said to be established as a principle of international law, and it is indeed held by some writers that no such right exists or is likely to be recognized, but its convenience is so great to both neutrals and belligerents that such a stipulation is frequently found in modern treaties. Whatever may be said of the unquestioned right of search possessed by a belligerent cruiser, except where restricted by treaty provisions, it may be presumed that a belligerent would to-day hardly insist on the exercise of this right in the case of neutral vessels under convoy of a vessel of war of their own country, unless under peculiar circumstances. Sec. 9. Convoy.

"The right of convoy, although not yet a part of international law, apparently approaches such a destiny, as it is now received by many jurists, and engrafted into the *conventional* law of almost all nations. Whether, as some put it, the word of honor of the commander of the convoying vessel ought to be sufficient proof may fairly be doubted. The French orders to their naval officers, issued in 1854 for the war with Russia, deserve notice for contemplating this point. 'You shall not,' say they, 'visit vessels which are under the convoy of an allied or neutral ship of war, and shall confine yourselves to calling upon the commander of the convoy for a list of the ships placed under his protection, together with his written declaration that they do not belong to the enemy, and are not engaged in any illicit commerce. If, however, you have occasion to suspect that the commander of the convoy has been imposed upon, you must communicate your suspicions to that officer, who should alone proceed to visit the suspected vessel.'"<sup>†</sup>

Hautefeuille expresses the following opinion in regard to the right of convoy: Hautefeuille on convoy.

\* Hall, p. 646.

† Woolsey, Sec. 191.

The belligerent cruiser that desires to know the nationality of merchant vessels under convoy, and be assured of their absolute neutrality—that is to say, that they are not engaged in carrying contraband of war, the only points to be determined by a visit—should address the commander of the convoying vessel and be satisfied with his verbal declaration, or at most his word of honor, that the vessels under his protection are the property of neutral subjects, and are not carrying contraband when bound to a port of the enemy. The neutral government is directly responsible for any fraud or violation of the neutral obligations committed by convoyed vessels under the protection of its flag, and it is to that government that the injured belligerent must look to obtain redress.

Convoy by  
another  
neutral.

He discusses also the question whether a merchant vessel can place itself under the convoy of another neutral flag, and decides that such protection can be given by a State only to vessels under its own flag, since the declaration of the commander of the convoying vessel, by which the exemption from visitation is secured, can be complete as to vessels of his own nationality alone.\*

Ortolan's views.

M. Ortolan insists strongly on the recognition of the right of convoy, and holds that, even where no treaty stipulations exist as to convoy, the vessels of war of a belligerent have no right to examine merchant vessels under convoy of their own flag. The declaration of the commander of the vessel of war as to their nationality and lawfulness of trade engaged in must be accepted.†

Sec. 10. Objec-  
tions to the  
right of con-  
voy.

As said in the preceding section, the right of a nation to claim exemption from visitation and search for its merchant ships when convoyed by a vessel of war is disputed by some writers, generally English and American, who accept fully the principles laid down by Lord Stowell.

Kent.

Kent says: "Two powers may agree among themselves that the presence of one of their armed ships along with their merchant ships shall be mutually understood to imply that nothing is to be found in that convoy of merchant ships inconsistent with amity or neutrality. But no belligerent power can legally be compelled, by mere force, to accept of such a pledge; and every belligerent power who is no party to the agreement

\* Hautefeuille, Vol. III, pp. 157-166.

† Ortolan, Vol. II, p. 271.

has a right to insist on the only security known to the law of nations on this subject, independent of any special covenant, and that is the right of personal visitation and search to be exercised by those who have an interest in making it. The penalty for the violent contravention of this right is the confiscation of the property so withheld from visitation; and the infliction of this penalty is conformable to the settled practice of nations, as well as to the principles of the municipal jurisprudence of most countries in Europe. There may be cases in which the master of a neutral ship may be authorized, by the natural right of self-preservation, to defend himself against extreme violence threatened by a cruiser grossly abusing his commission; but, except in extreme cases, a merchant vessel has no right to say for itself, and an armed vessel has no right to say for it, that it will not submit to visitation and search, or be carried into a proximate port for judicial inquiry.”\*

Woolsey says of convoy, after stating that the right is Woolsey. engrafted on the *conventional* law of almost all nations: “On the ground of justice this right cannot be defended. It is said that the commander of the convoying vessel represents the State, and the State guarantees that nothing illicit has been put on board the merchantmen. But how can the belligerent know whether a careful search was made before sailing, whether the custom-house did not lend itself to deception? It is only by comity that national vessels are allowed their important privileges; how, except by a positive and general agreement, can these privileges be still further extended, so as to limit the belligerent right of search? But on the ground of international good-will the right is capable of defence, and, so far as we can see, except where the protected fleet is far separated by a storm from its guardian—in which case we suppose the ordinary right of search must be resumed—can be exercised in the interests of belligerents as well as neutrals.”†

Mr. Hall says, in arguing against this right: Hall. “It cannot even be granted that the doctrine possesses a reasonable theoretic basis. The only basis, indeed, on which it seems to be founded is one which, in declaring that the immunity from visit possessed by a ship of war extends itself to the vessels in her company,

\* Kent, p. 161.

† Woolsey, Sec. 192.

begs the whole question at issue. It is more to the purpose to consider whether the privilege claimed by neutrals is fairly consistent with the interests of belligerents, and whether it would be likely, in the long run, to be to the advantage of neutral States themselves.

"If the doctrine is accepted it would not unfrequently happen that instances in which protection of convoy has been abused will come afterwards to the knowledge of the belligerent to whose injury they have occurred; he will believe that the cases of which he knows are but a fraction of those which actually exist; he will regard the conduct of the neutral State with suspicion; complaints and misunderstandings will arise, and the existence of peace itself may be endangered. It cannot be too often repeated that the more a State places itself between the individual and the belligerent, the greater must be the number of international disputes. And belligerents will always look upon convoys with doubt, from the mere fact that their innocence cannot be tested.

"It cannot but be concluded that the principle of the exemption of convoyed ships from visit is not embraced in authoritative international law, and that while its adoption into it would be injurious to belligerents, it would not be permanently to the advantage of neutrals."\*

U. S. Navy Regulations.

The Navy Regulations of 1876 instruct officers in command of convoying vessels not to permit ships under their protection to be searched or detained by any belligerent or other cruiser.

As the Regulations also require commanding officers to be furnished with lists of vessels under convoy, containing all particulars of nationality and ownership, and also, in case of a vessel bound to a belligerent port, *proof* that no contraband goods are on board, the objects of a search would seem to be more easily attained by calling upon the convoying vessel than by visitation and search of each merchant ship. What more can be asked by the belligerent than a knowledge of the nationality and nature of the voyage of merchant vessels encountered at sea, and proof that no contraband is carried to an enemy?†

Sec. 11, Belligerent convoy.

"If a belligerent takes a neutral under his convoy, it is, as far as that belligerent is concerned, a lawful act of war; and he

\* Hall, p. 642.

† Navy Regs., p. 133.

burdens himself with the duty in order to secure an advantage against his enemy. This is not done for the purpose of rendering service to neutrals not liable to capture, but to screen offending neutrals from search, and if necessary and possible, from capture. It is not easy to ascribe any other motive to a neutral in putting himself under such protection. It is not enough for the ostensible neutral to say, or even to prove, that he is not justly liable to capture; for the law of nations requires him to afford the belligerent a certain mode of satisfying himself on that point by visit and search; and if he refuses, resists, or fraudulently evades the proper search, he is for that cause liable to capture. The only question ever raised has been whether the fact of being found under belligerent convoy affords a conclusive presumption of an intent to deprive the other belligerent of the right of search, or only is a fact, having its weight, but open to explanation. In England the Lords of Appeal, in an unreported case, decided that the bare fact was conclusive. There has been no judicial decision on that subject in the United States. Judge Story, in the *Nereide*, says, in the course of his reasoning: 'My judgment is that the act of sailing under the belligerent convoy is a violation of neutrality; and the ships and cargo, if caught *in delicto*, are justly confiscable; and, further, if resistance is necessary, as in my opinion it is not, to perfect the offence, still the resistance of the convoy is to all purposes the resistance of the association.' '\*

The same views are held by nearly all writers on international law, M. Hautefeuille seeming to stand alone in advocating a contrary doctrine.

The government of the United States, in many negotiations, has adopted the views of M. Hautefeuille, given in a preceding section, as stipulations are found in several treaties now in force recognizing the exemption of vessels under convoy from visitation and search.

Article XXIII of the treaty with Bolivia, of 1858, is as follows: "It is further agreed that the stipulations above expressed, relative to the visiting and examination of vessels, shall apply only to those which sail without convoy; and when

Sec. 12. Treaties  
of the United  
States.

\* Dana's Wheaton, p. 708, n.



vessels shall be under convoy, the verbal declaration of the commander of the convoy, on his word of honor, that the vessels under his protection belong to the nation whose flag he carries, and when they are bound to an enemy's port, that they have no contraband goods on board, shall be sufficient."\*

The same agreement is contained in treaties made by the United States with the following nations: United States of Colombia, 1846; Dominican Republic, 1867; Ecuador, 1839; Guatemala, 1849; Hayti, 1864; Italy, 1871; Mexico, 1848; Morocco, 1836, and San Salvador, 1850. Other treaties that contained this stipulation are obsolete.

The treaties with Hayti and the Dominican Republic specially agree that vessels having contraband goods on board and bound to an enemy's port shall not be admitted to the protection of convoy.

The Navy Regulations prescribe the duties of the commanding officer of a convoying vessel with sufficient clearness. One article is to be noted especially as prohibiting convoy of the vessels of a belligerent, or even of another neutral, except when ordered or under peculiar circumstances, which must be reported to the Navy Department at the earliest opportunity.†

\* U. S. Treaties, 1873, "Bolivia," p. 87.

† Navy Regs. p. 134.

## PART VII.

### SHIPS' PAPERS' AND NATIONALITY.

"In general, and unless under special circumstances, the character of ships depends on the national character of the owner, as ascertained by his domicile ; but if a vessel is navigating under the flag and pass of a foreign country, she is to be considered as bearing the national character of the country under whose flag she sails : she makes a part of its navigation, and is in every respect liable to be considered as a vessel of the country ; for ships have a peculiar character impressed upon them by the special nature of their documents, and are always held to the character with which they are so invested, to the exclusion of any claims of interest which persons resident in neutral countries may actually have in them."\*

Sec. 1. How the nationality of a ship is determined.

The documents by which the national character is given to merchant ships are prescribed by the laws of different nations, and their force is frequently recognized in treaties. It is very necessary that the naval officer should be familiar with them and the value they possess under all circumstances.

By the laws of the United States, "vessels registered pursuant to law, and no others, except such as shall be duly qualified according to law for carrying on the coasting trade and fisheries, or one of them, shall be deemed vessels of the United States, and entitled to the benefits and privileges appertaining to such vessels ; but they shall not enjoy the same longer than they shall continue to be wholly owned by citizens and commanded by a citizen of the United States. And officers of vessels of the United States shall in all cases be citizens of the United States.

"Vessels built within the United States, and belonging wholly to citizens thereof, and vessels which may be captured in war by citizens of the United States, and lawfully condemned as prize, or which may be adjudged to be forfeited for a breach of

\* Dana's Wheaton, p. 425.

the laws of the United States, being wholly owned by citizens, and no others, may be registered as directed in this title."\*

Sec. 2. Territorial character of the ships of a nation.

Vattel says of the territorial character of the vessels of a country, "it is natural to consider the vessels of a nation as parts of its territory, especially when they sail upon a free sea, since the State retains its jurisdiction over those vessels." "According to the commonly received custom this jurisdiction is preserved over the vessels even in parts of the sea subject to a foreign dominion."†

Wheaton does not admit that merchant vessels possess the character of territoriality which he says belongs to men-of-war. "They form no part of the neutral territory, and, when within the territory of another State, are not exempt from the local jurisdiction. That part of the ocean which is temporarily occupied by them forms no part of the neutral territory; nor does the vessel itself, which is a movable thing, the property of private individuals, form any part of the territory of that power to whose subjects it belongs. The jurisdiction which that power may lawfully exercise over the vessel on the high seas is a jurisdiction over the persons and property of its citizens; it is not a territorial jurisdiction. Being upon the ocean, it is a place where no particular nation has jurisdiction; and where, consequently, all nations may equally exercise their international rights."‡

The same view is held by M. Ortolan, who confines the character of territoriality to vessels of war exclusively.§

Views of Haute-feuille.

Hautefeuille is in accord with Vattel, for he says: "Sea-going vessels are of two descriptions: those which, belonging to the State, are entrusted with the exercise of the sovereign power and jurisdiction, and consequently with making war, and those which are private property and confined to the commercial operations of the subjects of the State. These two classes of vessels possess territoriality equally and to the same degree. Without doubt there is between these two descriptions of vessels a great difference, but it does not bear on the question of territoriality. Both belong to the nation whose flag they bear, both are subject to the laws of the sovereign, and consequently both

\* Rev. Stat. U. S., Secs. 4131-32.

† Lawrence's Wheaton, p. 736.

‡ Vattel, p. 102.

§ Ortolan, Vol. I, p. 211.

are territorial. It is even indispensable that both should have and maintain this quality, for if one should cease to possess it, the other would at once cease to have over it any right of protection and jurisdiction, since these rights can be exercised only upon the territory."\*

After an American vessel has been measured and classed by the customs authorities, as directed by the laws of the United States, her register is issued to her, and her registry number assigned her must be carved or otherwise permanently marked on the main beam of the ship, her tonnage is marked on the after beam of the main hatch, and her name and the name of the port where she is owned must be distinctly painted on the stern. Should a vessel at any time cease to have her registry number marked as above, she will not be recognized as a vessel of the United States. Changing the name of a registered vessel without proper authorization will subject her to forfeiture.†

Sec. 3. The papers required by American vessels.

For vessels engaged in the coasting trade of the United States an enrollment takes the place of registration, which is necessary only for vessels employed in foreign trade. A form of license is prescribed for vessels employed in the fisheries.‡

Sea-letters, or passports, are to be furnished by the collectors of customs districts to vessels of the United States, and unregistered vessels owned by citizens of the United States, sailing from a port of the United States on a foreign voyage. These passports certify to the national character and ownership of the vessels.§

For the purpose of ascertaining the nature of the voyage upon which a merchant vessel is engaged, her manifest, or list of cargo, and her clearance must be examined. Her bill of health will also be of use in determining this point.

A list of the papers required to be carried by the merchant vessels of the principal foreign commercial countries will be found in the appendix to this work.

"Foreign-built vessels, purchased and owned by citizens of the United States, are entitled to the protection of the flag as the property of American citizens, but no register, enrollment, license or other marine document prescribed by the laws of the United States can be lawfully issued to them."||

Sec. 4. Protection of unregistered vessels.

\* *Hautefeuille*, Vol. I, p. 290.

† *Rev. Stat. U. S.*, Secs. 4177-79.

‡ *App. I.*

§ *App. I.*

|| *U. S. Consul's Man.*, p. 273.

"The privilege of carrying the American flag is under the regulation of Congress, and the statutes have not made that privilege practicably available to any ships except those duly registered or enrolled at some custom-house."\*

On this point Mr. Cushing, when Attorney-General of the United States, gave the following opinion: "A citizen of the United States has a right to purchase a merchant ship of a belligerent anywhere, at home or abroad, in a belligerent port or a neutral port, or even upon the high seas; the bill of sale is a sufficient authentication of his title. Provided the purchase be *bonâ fide* made, and the property be passed absolutely and without reserve, the ship so purchased, though it has not the privilege peculiar to American-built ships, of being registered or enrolled, becomes entitled to bear the flag and receive the protection of the United States."†

Such ships, however, are not allowed to enter ports of the United States; they must be employed exclusively in foreign waters.

The opinion of Mr. Cushing was given with special reference to purchases made during a war from either belligerent. Such transfers are looked upon with great suspicion by belligerents always, and perfect frankness and good faith must be observed by both parties to the sale. The French courts do not recognize the sale of vessels to a neutral during war, holding such a transaction to be simply an attempt to escape from the liability to capture.

Sec. 5. Treaty stipulations concerning papers.

The papers which serve to establish the nationality of vessels are, from their importance, frequently made the subject of treaty stipulations. Hautefeuille says of the capture of neutral vessels and of the papers which should be found on board merchant vessels: "In all cases of doubt, recourse must be had to treaties, if any exist; if there are none, the internal law of the neutral must be applied to the exclusion of that of the belligerent. This principle controls all the questions that can arise as to the seizure of neutral vessels."‡

It is necessary then for the naval officer to be familiar with the agreements, if any, that his government has entered into.

\* Consular Reg. 1870, Sec. 226. † Lawrence's Wheaton, p. 583, *n.*

‡ Hautefeuille, Vol. II, p. 236.



The following treaties of the United States, now in force, prescribe the use of certain papers by the merchant ships of the contracting parties.

By the treaty of 1853, with the Argentine Confederation, it is agreed to recognize as vessels of the United States, or of the Argentine Confederation, all those furnished with a regular passport, or sea-letter, by the competent authority under the existing laws of either government.\*

The treaties with Belgium, 1858; United States of Colombia, 1846; Italy, 1871; Morocco, 1836; Holland, 1839; Turkey, 1862, and Paraguay, 1859, contain similar stipulations.

Bolivia, 1858, the Dominican Republic, 1867, and Ecuador, 1839, stipulate that vessels under their flags which are owned by their citizens, and whose captains are citizens of the respective nations, shall be considered as having the national character, although they may have been built in foreign countries and have foreign crews. This stipulation was inserted in the treaties in each case expressly to foster the small merchant marine of those countries.

In many treaties it is further stipulated that, in time of war, in which one of the contracting parties is engaged, the ships of the other shall have, in addition to papers establishing their nationality, certificates of their cargoes, or manifests, which must be exhibited to show that no contraband goods are carried. Without such manifests, the ships may be detained and adjudged lawful prize, unless the absence of the papers shall be owing to accident, and be replaced by testimony entirely equivalent. The treaties now in force containing this stipulation are those with Bolivia, 1858; United States of Colombia, 1846; the Dominican Republic, 1867; Ecuador, 1839; Hayti, 1864; Guatemala, 1849; Spain, 1795; Sweden and Norway, 1827; Mexico, 1848, and San Salvador, 1850.

The treaty of 1799, with Prussia, revived by that of 1828, stipulates that vessels shall be provided with crew-lists, in addition to the sea-letters and charter parties, or bills of lading; but the possession of these papers shall not be deemed absolutely necessary when vessels have sailed before or within three months of the date at which their government is informed

\* U. S. Treaties, 1873, Argentine Confederation, p. 27.

that the other party is engaged in a war. In the meantime, in default of these specific documents, the neutrality of vessels may be established by such other evidence as the tribunals appointed to judge such cases may deem sufficient.\*

Among the papers enumerated by Mr. Upton as being necessary to establish the nature of the voyage upon which a merchant vessel is engaged, is "The letter of instructions to the master, with which, especially in times of war, the neutral master should always be provided. These instructions should always be produced. The withholding them has been held a just cause of suspicion, authorizing detention. These letters of instruction or the other papers should always show the alternative destination of a ship, so as to establish the fact that such alternative destination be fair and not fraudulent."†

Sec. 6. False papers. Concealment or spoliation.

"The production of false papers has always been held a just cause of suspicion, justifying seizure, although under some peculiar circumstances it has not been held to be such conclusive proof as warrants condemnation, if the circumstances are clearly explained."‡

"The concealment of papers material for the preservation of the neutral character justifies a capture and carrying into port for adjudication, though it does not absolutely require a condemnation. It is good ground to refuse costs and damages on restitution, or to refuse further proof to relieve the obscurity of the case, where the cause labored under heavy doubts and there was *primâ facie* ground for condemnation independent of the concealment. The spoliation of papers is a still more aggravated and inflamed circumstance of suspicion. That fact may exclude further proof, and be sufficient to infer guilt; but it does not, in England, as it does by the maritime law of other countries, create an absolute presumption *juris et de jure*; and yet a case that escapes with such a brand upon it is saved so as by fire. The Supreme Court of the United States has followed the less rigorous English rule, and held that the spoliation of papers was not of itself sufficient ground for condemnation, and that it was a circumstance open for explanation, for it may have arisen from accident, necessity, or superior force. If the explanation be not prompt and frank, or be weak

\* U. S. Treaties, 1873, Prussia, p. 719. † Upton, p. 338. ‡ *Ibid.* p. 339.

and futile ; if the cause labors under heavy suspicions, or there be a vehement presumption of bad faith or gross prevarication, it is good cause for the denial of further proof ; and the condemnation ensues from defects in the evidence, which the party is not permitted to supply. The observation of Lord Mansfield, in *Bernardi v. Motteux*, was to the same effect. By the maritime law of all countries, he said, throwing papers overboard was considered a strong presumption of enemy's property ; but in all his experience he had never known a condemnation on that circumstance only.”\*

“The refusal by the master of a neutral merchant vessel to permit the papers of his vessel to be taken on board of a beligerent cruiser when demanded, to be there examined by the commander of the cruiser, especially after those papers have been already so far examined on board of the merchant vessel by a subordinate officer from the cruiser as to excite suspicion concerning their regularity, is, on the part of the neutral master, a resistance to the right of visitation and search, even though he offers his papers for examination on board of his own vessel, and his vessel for search.”†

Duty of the neutral master.

Under some circumstances the flag carried by a vessel, and even her papers showing a presumed nationality, will not protect her from capture at sea by the vessels of war of another country. The case of the steamer *Virginus* illustrates several rules of international law applicable to the jurisdiction which may be exercised over merchant ships at sea. The *Virginus*, carrying the American flag and provided with an American register, was captured by a Spanish vessel of war in the Caribbean sea, October 31st, 1873, while endeavoring to reach the waters of Jamaica, having previously failed in an attempt to land a party of insurgents on the coast of Cuba. It was at first supposed that she was a *bonâ fide* American vessel, and the United States made a demand upon Spain for restoration of the vessel and a salute to the flag. The demand was acceded to by Spain, and the vessel was handed over to the United States, but with a stipulation that if it could be proved by a given date that the *Virginus* was not entitled to carry the American flag, the salute

Sec. 7. Actual ownership of a vessel gives jurisdiction over her.

\* Kent, Vol. I, p. 167.

† Blatchford, Prize Cases, p. 535. The *Peterhoff*.

should be dispensed with and only a disclaimer made of any intent of indignity to the flag. The United States, on the same condition, agreed to take legal proceedings against the vessel and the persons guilty of violations of her laws. It was proved that the owners of the *Virginius* were Spanish subjects, that her American registration was fraudulent, and consequently she had no right to carry the American flag and claim its protection.

The discussion of this case brought out the following principles of international law :—

A vessel on the high seas is under the jurisdiction of the State of which her actual owners are citizens or subjects. The registration granted to a vessel by a nation is not recognized by international law as a national guaranty of national character for all the world. It may have been obtained by fraud, as in the case of the *Virginius*, and nations have a right to go behind such a document to establish the fact of ownership and consequent jurisdiction. Even a genuine register is not conclusive between nations on the question of the right to arrest a vessel guilty of offences against international law. A nation has the right, for purposes of jurisdiction over the vessels of its subjects at sea, to decide by its vessels of war whether its merchant ships are not carrying a foreign flag.

“The right of self-defence authorizes a nation to visit and capture a vessel as well on the high seas as in its own waters, when there is reasonable ground to believe it to be engaged in a hostile expedition against the territory of such nation.

“A nation's right of jurisdiction on the high seas over vessels owned by its citizens or subjects authorizes the detention and capture of a vessel found on the high seas which, upon reasonable ground, is believed to be owned by its citizens or subjects, and to be engaged in violating its laws. The flag or register of another nation, if not properly belonging to a vessel, does not render its detention unlawful by the cruiser of a nation to which its owners belong. As, however, the register affords *prima facie* evidence of nationality, the nation which gave the register by mistake must be treated with great care, detention on grounds proved to be erroneous must be atoned for, and the question of ownership would naturally be committed, where the evidence is not patent, to a third party.”\*

\* Woolsey, App. III, p. 468*a*, n. 29.

## PART VIII.

### PRIZE, CAPTURE AND SALVAGE.

Any vessel belonging to the enemy, encountered by a belligerent cruiser at sea, or within the territorial jurisdiction of either belligerent, becomes a lawful prize on capture. A neutral vessel becomes a lawful prize if captured by a belligerent cruiser in violating a legally established blockade, in carrying enemy's troops or despatches, or for resisting visitation and search. Any neutral vessel found carrying contraband of war to an enemy's port, or for his military use, may be captured and sent into a port of the captor for adjudication and condemnation of the contraband cargo. A vessel guilty of piracy under the law of nations may be captured by the public vessels of any nation. Merchant vessels also may capture piratical craft, and they are entitled to the proceeds of the prize.

Sec. 1. What is lawful prize.

It has been held by the courts of the United States that a neutral vessel, guilty of offences against the law of nations, may be captured by a vessel in the service of the government but not commissioned as a cruiser. "The filing by the United States of a libel against the vessel and cargo as prize is an affirmation by the United States of the capture, and such ratification is equivalent to an original seizure by authority of the government."\*

"As the right of capture, of making a prize, is a direct emanation from the right of war, it follows that there is no possibility of exercising this right of prize against the vessels of a nation, unless the government of the captor has declared war against the State to which the captured vessel belongs, and issued orders to cruise against the vessels of that nation."†

Sec. 2. The right to make prizes.

Prizes cannot be made within the territory of a neutral government.

Sec. 3. Where prizes can be taken.

\* Blatchford, Prize Cases, p. 561. The Emma.

† Lawrence's Wheaton, p. 878, n.



"This right of capture is confessedly such a right as may be exercised within the territory of the belligerent State, within the enemy's territory, or in a place belonging to no one; in short, in any place except the territory of a neutral State."\*

Sec. 4. How the validity of capture is determined.

"The validity of maritime captures must be determined in a court of the captor's government, sitting either in his own country or in that of its ally. This rule of jurisdiction applies whether the captured property is carried into a port of the captor's country, into that of an ally, or into a neutral port. Respecting the *first* case there can be no doubt. In the *second* case, where the property is carried into the port of an ally, there is nothing to prevent the government of the country, although it cannot itself condemn, from permitting the exercise of that final act of hostility, the condemnation of the property of one belligerent to the other; there is a common interest between the two governments, and both may be presumed to authorize any measure conducing to give effect to their arms, and to consider each other's ports as mutually subservient. Such an adjudication is therefore sufficient in regard to property taken in the course of the operations of a common war."†

In regard to the *second* case stated above, it should be noted that the Supreme Court of the United States has decided that, under existing statutes, the United States District Courts have exclusive original jurisdiction in all prize proceedings. Condemnations of vessels and their cargoes by temporary prize courts, established during war with the sanction of the Executive, could not be sustained by the law of nations, or the Constitution of the United States.‡

As to prizes carried into a neutral port, international usage no longer permits this to be done, except in cases of necessity, and the condemnation or sale of a prize would not be permitted in the port of a neutral under any circumstances. Wheaton says of the jurisdiction of prize courts: "This jurisdiction cannot be exercised by a delegated authority in the neutral country, such as a consular tribunal sitting in the neutral port, and acting in pursuance of instructions from the captor's State. Such a judicial authority, in the matter of prize of war, cannot be conceded by the neutral State to the agents of a belligerent power within its own territory, where even the neutral govern-

\* Lawrence's Wheaton, p. 735.

† *Ibid.* p. 669.

‡ *Ibid.* n.

ment itself has no right to exercise such a jurisdiction, except in cases where its own neutral jurisdiction and sovereignty have been violated by the capture. A sentence of condemnation, pronounced by a belligerent consul in a neutral port, is therefore considered as insufficient to transfer the property in vessels or goods captured as prize of war, and carried into such port for adjudication.”\*

“This jurisdiction of the national courts of the captor, to determine the validity of captures made in war under the authority of his government, is exclusive of the judicial authority of every other country, with two exceptions only: 1. Where the capture is made within the territorial limits of a neutral State. 2. Where it is made by armed vessels fitted out within the neutral territory.

“In either of these cases the judicial tribunals of the neutral State have jurisdiction to determine the validity of captures thus made, and to vindicate its neutrality by restoring the property of its own subjects, or of other States in amity with it, to the original owners.”†

“Lord John Russell said in the House of Commons in May, 1861, referring to the capture of British vessels during the War of Secession in the United States: “When the British government acknowledged the rights of either belligerent to visit and detain British merchant vessels having enemy’s property on board, and to confiscate such property, it necessarily implied, as a condition of such acknowledgment, that the detention was for the purpose of bringing the vessel detained before an established court of prize, and that confiscation did not take place until after condemnation by such competent tribunal.”

Sec. 5. The title to a prize, how transferred.

“By modern usage a complete title to a prize taken at sea is given to the captor only by the sentence of a competent court. By a competent court is intended one which, by the law of the State, has jurisdiction in matters pertaining to prize, no matter what other jurisdiction it may have or not have. Such courts in the United States are the District and Circuit Courts of the confederation, with appeal up through the Circuit to the Supreme Court of the Union. In general, the court must be one acting under the authority of the captor’s sovereign, and holding its sessions at home or within the territory of an ally.”‡

\* Lawrence’s Wheaton, p. 672. † *Ibid.* p. 671. ‡ Woolsey, Sec. 141.

It has been held by some of the highest British authorities that in order to constitute a prize court, competent under the law of nations to pronounce a valid sentence of condemnation, certain conditions are essential:

"1. The court must be one *belonging to the belligerent country*.

"2. The court must have, at the time it pronounced sentence of condemnation, actually *sat in the country* to which it belonged, and not within the dominions of any foreign prince, whether neutral or an ally; for, otherwise, a captor might have innumerable seats of war, and elude the fair chance of recaption whilst the vessel or property was in progress towards a proper condemning port.

"3. The ship or other property condemned as prize must, at the time of condemnation, in general, be actually in the country where the sentence was pronounced."\*

Sec. 6. Duty of  
the captor.

"The laws of the State determine the steps which the captor, as the State's agent, must take in regard to the property, and especially at what time he is allowed to have an entire or partial interest in the things taken. 'It is the first duty of the captor,' says Mr. Wildman, 'to bring in his prize for adjudication; but if this is impossible, his next duty is to destroy the enemy's property; if it be doubtful whether it be the enemy's property, and impossible to bring it in, no such obligation arises, and the safe and proper course is to dismiss.' Of course, if this doctrine, based on English decisions, be true, destruction of neutral ships or property by mistake must be made good by the cruiser's government. The doctrine is unsafe for neutrals, where the cruiser pertains to a belligerent *de facto*, attempting to become a nation, not to a lawful and acknowledged power."†

The Supreme Court of the United States, in passing upon a case growing out of the Mexican War, laid down the following principles as to the duty of captors:

"A prize court, when a proper case is made for its interposition, will proceed to adjudicate and condemn the captured property, or award restitution, although it is not actually in the control of the court. It may always proceed *in rem* whenever the prize, or proceeds of the prize, can be traced to the hands of any person whatever.

\* Vattel, p. 166, n.

† Woolsey, Sec. 140.

"As a general rule it is the duty of the captor to bring it within the jurisdiction of a prize court of the nation to which he belongs, and to institute proceedings to have it condemned. This is required by the Act of Congress in cases of capture by ships of war of the United States; and this act merely enforces the performance of a duty imposed upon the captor by the law of nations, which, in all civilized countries, secures to the captured a trial in a court of competent jurisdiction before he can finally be deprived of his property.

"But there are cases where, from existing circumstances, the captor may be excused from the performance of this duty, and may sell or otherwise dispose of the property before condemnation. And where the commander of a national ship cannot, without weakening inconveniently the force under his command, spare a sufficient prize-crew to man the captured vessel, or where the orders of his government prohibit him from doing so, he may lawfully sell or otherwise dispose of the captured property in a foreign country, and may afterwards proceed to adjudication in a court of the United States."\*

The Act of Congress for the better government of the Navy of the United States, approved July 17, 1862, forbids taking out of a prize, before condemnation by a competent court, any article of her cargo, tackle or equipment, unless it be for the preservation of such articles, or they be deemed absolutely necessary for the use of any of the armed vessels or armed forces of the United States; "but the whole, without fraud, concealment or embezzlement, shall be brought in, in order that judgment may be passed thereon; and any and every person who offends against this article shall be punished as a court martial shall direct."

The duties of the commander of a vessel of war taking a prize, and of the officer sent as prize-master, are clearly laid down in the United States Navy Regulations of 1876.†

The practice of destroying prizes at sea when they cannot be sent into a port of the captor has been sanctioned by the custom of nations, and it has been directly authorized, at different times, by the United States, France, and Great Britain. Mr. Dana says: "If the prize is unseaworthy for a voyage to the proper port, or if there is impending danger of immediate

Sec. 7. Destruction of prizes.

\* Howard's Rep., Vol. XIII, p. 515.

† Chap. XX, p. 135.

recapture from an enemy's vessel in sight, or if an infectious disease is on board, or other cause of a controlling character, the law of nations authorizes a destruction or abandonment of the prize, but requires all possible preservation of evidence, in the way of papers and persons on board. And, even if nothing of pecuniary value be saved, it is the right and duty of the captor to proceed for adjudication in such a case, for his own protection and that of his government, and for the satisfaction of neutrals."\*

As the present usage not only forbids the sale of prizes in the ports of a neutral, but also prohibits taking them into such ports except in cases of necessity arising from the perils of the sea or want of provisions, and limits their stay to the time actually necessary to fit them for sea, when the captor finds that he cannot send his prize into one of his own ports without an almost certain exposure to recapture, it only remains to exact a ransom bond, or, if this is refused or considered inadmissible, to destroy the vessel. This course would be allowable under any circumstances, with respect to property clearly belonging to the enemy.

Mr. Dana says of the course pursued by the Confederate cruisers during the War of Secession, but without expressing an opinion: "In the Civil War in the United States a question of interest was presented as to the rights of captors. After the first few months the rebel cruisers made no attempt to send in their prizes, but destroyed them at sea. The justification alleged was the stringent blockade of their ports by the United States. At the same time, merchant vessels, both rebel and British, were constantly attempting, and often successfully, the breach of blockade at many points. The question was not presented to any court or diplomatically, as the rebel government disappeared. But, in some future war, the question may arise whether the mere fact of the existence of a blockade of all the ports of a belligerent, making the sending-in a prize a matter of hazard, but such as neutral merchant vessels run, will justify the continuance of a practice of capturing and destroying. How long may that be kept up by a belligerent whose maritime power is so reduced that he has no port of his own that his cruisers can use? The rebel cruisers continued their work

\* Dana's Wheaton, p. 485, n.



of destruction for three years or more after they had no port that, by their own statement, they could resort to for any purpose.”\*

In the case of neutral vessels captured by a belligerent cruiser, destruction would, under no circumstances, be permitted. Mr. Hall says of the duty of the captor: “He must bring in the captured property for adjudication, and must use all reasonable speed in doing so. In cases of improper delay, demurrage is given to the claimant, and costs and expenses are refused to the captor. It follows as of course from this rule—which itself is a necessary consequence of the fact that the property in neutral ships and goods is not transferred by capture—that a neutral vessel must not be destroyed; and the principle that destruction involves compensation was laid down in the broadest manner by Lord Stowell; where a ship is neutral, he said ‘the act of destruction cannot be justified to the neutral owner by the gravest importance of such an act to the public service of the captor’s own State; to the neutral it can only be justified under any circumstances by a full restitution in value.’ It is the English practice to give costs and damages as well; to destroy a neutral ship is a punishable wrong; if it cannot be brought in for adjudication, it can and ought to be released.

Treatment of  
neutral vessels  
captured.

“In the course of bringing in, the captor must exercise due care to preserve the captured vessel and goods from loss or damage; and he is liable to penalties for negligence. For loss by fortune of the sea he is of course not liable.”†

“At the commencement of the War of American Independence, Great Britain, not considering her colonies as legitimate enemies, published two Acts of Parliament, declaring that all British ships retaken from the rebels, by whomsoever recaptured, should be restored to the owners, upon the deduction of one-eighth for salvage.”‡

Sec. 8. Validity  
of capture by  
rebels.

The same course was pursued by the United States in the War of Secession. “In the case of a vessel captured by a Confederate privateer, carried into Charleston, South Carolina, and there condemned by a tribunal acting under the assumed authority of the Southern Confederacy, and sold under its decree, and subsequently registered at Liverpool as a British

\* Dana’s Wheaton, p. 487, *n*.

† Hall, p. 652.

‡ Lawrence’s Wheaton, p. 659, *n*.

vessel and in the name of a British subject as sole owner, it was held that no proceedings of any such prize court can have any validity in a court of the United States and that a sale under them would convey no title to the purchaser, nor confer upon him any right to give a title to others. At the same time salvage was allowed under the Act of 1800, as in the case of a merchant vessel taken by a public enemy and recaptured by a public armed ship of the United States. It is said 'the language of this statute is perhaps in strictness applicable only to captures in an international war. But the analogy is so close that I think it most proper to adopt the rule therein prescribed in the present case.'"\*

Sec. 9. Capture  
made by allied  
forces.

Where captures are made by the cruisers of allied powers, the method of adjudication is settled by conventions between the powers acting in concert.

"By the Convention of May 10, 1854, between England and France, regulating joint captures during the war with Russia, the adjudication belonged to the country of the senior officer; and when a cruiser only intimidated by its presence, the jurisdiction belonged to the country of the actual captor. In case of the capture of a merchant ship of either country, the adjudication belonged to the country of the captured vessel."†

Sec. 10. Prize  
money.

"The laws of some States hold out special rewards to encourage the capture of vessels, especially of commissioned vessels, of their enemies. Such is the head-money of five pounds, due under a section of the British Prize Act, to all on board an armed vessel acting under public authority, for every man on board a similar captured vessel who was living at the beginning of the engagement. Such too, in a sense, are the advantages given to other vessels which have assisted the capturing one, or even started to render assistance."‡

United States  
Prize Act.

The Act of Congress of June 30, 1864, allows a bounty of one hundred dollars for every person on board an armed vessel, at the beginning of an engagement, sunk or otherwise destroyed by a vessel of war of the United States of superior force, and two hundred dollars for every person on board such vessel when of equal or superior force to the capturing vessel. A bounty of fifty dollars is also allowed for every person on board

\* Lawrence's Wheaton, Addenda, p. 1020.

† *Ibid.* p. 670, n.

‡ Woolsey, Sec. 144.

an armed vessel of the enemy destroyed in the public interests, but not from damages received in action. These bounties are to be distributed among the captors in the same manner as prize money.\*

Half the net proceeds of unarmed vessels of an enemy, or neutral when condemned as lawful prize, is distributed among the captors, the remainder going to the Navy Pension Fund.

All vessels of the United States Navy are entitled to share in the proceeds of a prize, when within signal distance of the vessel making the capture.†

A neutral government must not interfere in any measures taken by a belligerent to enforce his rights, beyond seeing that no injustice is done to its subjects. Sec. 11, Relation of a neutral to prize proceedings.

On this point the following language was used in Parliament by the Solicitor-General of Great Britain in March, 1862: "Nothing is better known than that, if a belligerent State is acting *bonâ fide* to maintain a blockade with such force as it may think sufficient, and in such a manner as it may think right, neutral powers must await patiently the decisions of the prize court before which any of their ships may be taken for an alleged infringement of the blockade. More than that, they must not interfere, except by appeal, if the first decision is contrary to what they think right. However, if in the court of ultimate appeal some flagrant and indisputable wrong has been done—some principle of the law of nations disregarded—undoubtedly the country aggrieved is not bound by that decision, but has a right to demand restitution and compensation for the individuals ill-treated by the decision of the prize court. That is the ordinary law of nations. It is not a question whether a neutral country shall dictate belligerent operations to a belligerent nation, but whether, in every particular case, justice or injustice shall be done to the subject of a neutral government."‡

Mr. Lawrence, in his article on the "Constitution of Prize Courts," says of the course to be pursued in cases of alleged injustice to neutrals: "In the United States the course is, when it is claimed by a foreign minister that a seizure made by an American vessel of war was a violation of the sovereignty of

\* Rev. Stat., U. S., Sec. 4635.

† *Ibid.* 4632.

‡ Lawrence's Wheaton, p. 680, *n.*

his government, and he satisfies the President of the fact, the latter may, where there is a suit depending for the seizure, cause the Attorney-General to file a suggestion of the fact in the cause, in order that it may be disclosed to the court. Such was the course pursued in the case of the *Exchange*, a cause in which the sovereign right claimed by the Emperor of the French, and the political relations between the United States and France, were involved.”\*

Sec. 12. The captor must himself secure his prize.

The captor is required to make his possession of a prize complete and secure, and a neutral government cannot be called upon to interfere and restore a prize in case of escape or rescue by neutral subjects. The parties to a violation of the law of nations take upon themselves all the risks attending such action, but the penalties imposed by the law for resistance or rescue by a neutral crew can only be inflicted by a court of the captor's country. The case of the *Emily St. Pierre* illustrated fully this principle. This was a British vessel, captured for attempting to break the blockade of Charleston, S. C., and ordered to Philadelphia in charge of a prize-crew. The original crew regained possession of the vessel, and taking her to Liverpool, restored her to the owners. The United States applied to the British government for restitution of the vessel on the grounds that the rescue was in violation of international law and the duty of a neutral to submit to adjudication in the courts of the captor. The demand was refused on the grounds that in the rescue no offence had been committed against the municipal law of Great Britain, and that the penalty for resistance or rescue imposed by the law of nations could be enforced only by the courts of the captor.

During the correspondence between the two governments, Mr. Adams cited a parallel case, in which the positions had been reversed, that of the American brig *Experience*, captured by a British vessel of war, but rescued by her original crew and taken into Philadelphia in 1799. In this case the United States declined to interfere, but referred the British minister to the courts, expressing no opinion on the question beyond declining executive interference. No action was ever taken in either case beyond the diplomatic demand for restitution.

Of these cases Mr. Dana says: “It may therefore be con-

\* Lawrence's *Wheaton*, App., p. 970.

sidered as settled by these two cases that a neutral government is not required, by executive action, to restore a private vessel of one of its citizens, which has been rescued by her crew from her captors before condemnation, on demand of the government of the captors. The possessory belligerent right of the captors is not to be enforced by neutral powers by any positive action in the way of penalty or seizure for restitution. Whether the right can be vindicated by a possessory suit by the captors in the Admiralty Courts of the neutral has not been judicially determined; but the course of the political departments of both governments, and the reasoning on which they proceeded, seem to settle the judicial as well as the political question.”\*

Acts of resistance to capture and attempts to rescue a prize, by the neutral crew, are offences against the belligerent right of search and detention of vessels for proper inquiry, and will of themselves subject the vessel and cargo to condemnation.†

Sec. 13. Effect of resistance by the neutral crew.

The crew of a captured neutral vessel are not bound to assist the prize-crew in carrying her into port. They owe no service to the captors, but are considered as still answerable to the owners for their conduct. It is the duty of the captor, as said before, to provide for the safety of his prize, and if he neglects to do so, from any cause, it is at his own risk. The master of the vessel acts for his owners, and if the prize-crew cannot navigate the vessel into the port ordered, he may again assume the command. The crew of the captured vessel remain passive, and do not act against the interests of the owners; they are not required to make any resistance to capture by the terms of the shipping articles, nor must they do so, since this, as we have seen, may subject to condemnation property that otherwise might go free.‡

Sec. 14. Duty of the neutral crew.

The right of *postliminy* is that by virtue of which persons and property captured by an enemy are restored to their former condition and ownership on again coming into the power of the nation to which they originally belonged.

Sec. 15. The right of postliminy.

“The sovereign is bound to protect the persons and property of his subjects, and to defend them against the enemy. When, therefore, a subject, or any part of his property, has fallen into the enemy’s possession, should any fortunate event bring them

\* Dana’s Wheaton, p. 476, n. † Lawrence’s Wheaton, p. 666 and n.

‡ *Ibid.* Addenda, p. 1021.



again into the sovereign's power, it is undoubtedly his duty to restore them to their former condition—to re-establish the persons in all their rights and obligations, to give back the effects to the owners—in a word, to replace everything on the same footing on which it stood previous to the enemy's capture.

When this right  
takes effect.

“This right takes effect as soon as such persons or things captured by the enemy fall into the hands of soldiers belonging to their own nation, or are brought back to the army, the camp, the territories of their sovereign, or the places under his command.”\*

“The *jus postliminii* was devised as a legal fiction, according to which he (the prisoner of war) was treated as not having been away, or at least as having only been absent from his threshold, and all his lost rights or rights in abeyance were restored to him. The same *jus* was extended so as to cover certain kinds of things captured by the enemy; namely, slaves, ships of war and transport, mules, horses, and land, which thus returned on recapture to their original owner. Postliminy had no application to civil war, when the parties were not enemies in a political sense, nor to war with pirates, because they were robbers, and incapable of rights; but only to legitimate war between two States. Nor could its advantages be open to a deserter or other betrayer of his post, or to one whom the State itself had given up to the enemy.

Limit of time as  
to this right.

“As to the limit of time within which the *jus postliminii* takes effect, we are not aware that Roman law contains any definition. Modern usage gives complete possession of booty to the enemy on land, after he has held it for twenty-four hours, so that the former owner cannot claim it again from the purchaser; the reason for which limit is the difficulty of identifying such articles after a lapse of time. On the other hand, land is restored to its original owner, until peace or destruction of national existence has transferred sovereignty to the conqueror. By modern law captured ships with the goods on board, carried *infra præsidia* by the enemy and condemned, become absolutely his, so that, if they are afterwards recaptured or repurchased by a neutral, the former owner has nothing to do with them: their connection with him has wholly ceased.”†

“By the *general* law of nations, if a vessel be retaken *before*

\* Vattel, pp. 392–3.

† Woolsey, Sec. 143.

*condemnation*, by any ship of the nation of which the original owner is a subject, although even four years after the capture, he has a right to have the same restored to him, subject to his paying certain salvage to the recaptor.”\*

“As to the limit of place, modern postliminy takes effect only within the territory of the captor or his ally, with the single exception already mentioned of captives escaping ashore in a neutral port. But the Roman, it seems most probable, took effect within the borders of any friendly nation.”†

Limit as to place.

The immunity from recapture enjoyed by a prisoner of war escaping ashore in a neutral port from a belligerent vessel does not depend on the right of postliminy, but is due to the inviolability of the neutral territory, within which no such act of hostility as the pursuit and capture of an enemy can take place.

Vattel makes this restriction of the right depend on the duty of the neutral. “Now, the right of postliminium does not take effect in neutral countries; for where a nation chooses to remain neuter in a war, she is bound to consider it as equally just on both sides, so far as relates to its effects, and, consequently, to look upon every capture made by either party as a lawful acquisition. To allow one of the parties, in prejudice to the other, to enjoy in her dominions the right of claiming things taken by the latter, or the right of postliminium, would be declaring in favor of the former and departing from the line of neutrality.”‡

“A nation may make what laws it pleases in regard to the recapture of the goods of one of its subjects by another, but is bound to follow the *jus postliminii* in cases affecting the property of neutrals.”§

Sec. 16. Laws regulating this right.

“When any vessel or other property shall have been captured by any force hostile to the United States, and shall be recaptured, and it shall appear to the court that the same had not been condemned as prize before its recapture by any competent authority, the court shall award a meet and competent sum as salvage, according to the circumstances of each case.”||

“In cases arising between British subjects with one another, and also in cases arising between such subjects and those of her allies, peculiar modifications of the general law of nations were

\* Vattel, p. 385, *n*.

† Woolsey, Sec. 143.

‡ Vattel, p. 393.

§ Woolsey, Sec. 143.

|| Rev. Stat. U. S., Sec. 4652.

introduced or acknowledged by Great Britain. Thus it was established by several Acts of Parliament that the maritime right of postliminium shall subsist even to the end of the war ; and, therefore, the ships or goods of the subjects of this country taken *at sea* by an enemy, and afterwards retaken, even at any indefinite period of time, and whether before or after sentence of condemnation, are in general to be restored to the original proprietors, but subject to certain specified exceptions, and, in general, also subject to the payment of salvage to the recaptor.”\*

Sec. 17. Salvage

“As to ships and goods captured at sea and afterwards recaptured, rules are adopted somewhat different from those which are applicable to other personal property. These rules depend upon the nature of the different classes of cases to which they are applied. Thus the recapture may be made either from a pirate ; from a captor clothed with a lawful commission, but not an enemy ; or, lastly, from an enemy.

“In the first case there can be no doubt the property ought to be restored to the original owner ; for as pirates have no lawful right to make captures, the property has not been divested. The owner has merely been deprived of his possession, to which he is restored by the recapture. For the service thus rendered to him, the recaptor is entitled to a remuneration in the nature of salvage.

“If the property be retaken from a captor clothed with a lawful commission, but not an enemy, there would still be as little doubt that it must be restored to the original owner. For the act of taking being in itself a wrongful act, could not change the property, which must still remain in him.

“If, however, the neutral vessel thus recaptured were laden with contraband goods destined to an enemy of the first captor, it may perhaps be doubted whether they should be restored, inasmuch as they were liable to be confiscated as prize of war to the first captor. Martens states the case of a Dutch ship captured by the British under the rule of the war of 1756, and recaptured by the French, which was adjudged to be restored by the Council of Prizes, upon the ground that the Dutch vessel could not have been justly condemned in the British prize courts. But if the case had been that of a trade considered

\* Vattel, p. 385, n.

contraband by the law of nations and treaties, the original owner would not have been entitled to restitution.

"In general, no salvage is due for the recapture of neutral vessels and goods, upon the principle that the liberation of a *bonæ fidei* neutral from the hands of the enemy of the captor is no beneficial service to the neutral, inasmuch as the same enemy would be compelled by the tribunals of his own country to make restitution of the property thus unjustly seized."\*

"The laws of different nations vary in the amount of reward which they assign to the rescuer of vessels. In regard to the salvage to be paid to our recaptors or rescuers by the owners of foreign vessels and goods, the law of the United States adopts the principle of reciprocity, measuring the amount by that which is paid by the State to which the vessel belongs. In regard to the amount to be paid by citizens or resident foreigners, the law contains various provisions, of from one-half to one-twelfth of the value; more being granted for the salvage of an armed vessel recaptured than an unarmed, and more to a private vessel recapturing than to a public armed vessel. In no case is salvage allowed if the recapture occurs after condemnation by a competent authority, since the property is regarded as having passed over from the original owner to the captor.

Amount of salvage dependent upon municipal law.

"The legislation of a particular State may withhold salvage from its citizens or subjects, but cannot deprive a neutral or an ally of the exercise of this right."†

The law of the United States as to salvage is as follows: "If the captured property belonged to the United States, it shall be restored to the United States, and there shall be paid from the Treasury of the United States the salvage, costs, and expenses ordered by the court. If the recaptured property belonged to persons residing within or under the protection of the United States, the court shall adjudge the property to be restored to its owners, upon their claim, on the payment of such sum as the court may award as salvage, costs, and expenses. If the recaptured property belonged to any person permanently resident within the territory and under the protection of any foreign prince, government, or State in amity with the United States, and by the law or usage of such prince, government, or State, the property of a citizen of the United States would be restored

Law of the United States relating to salvage.

\* Lawrence's Wheaton, pp. 634-49-50.

† Woolsey, Sec. 144.

under like circumstances of recapture, it shall be adjudged to be restored to such owner, upon his claim, upon such terms as by the law or usage of such prince, government, or State would be required of a citizen of the United States under like circumstances of recapture; or, when no such law or usage shall be known, it shall be adjudged to be restored upon the payment of such salvage, costs and expenses as the court shall order. The whole amount awarded as salvage shall be decreed to the captors, and no part to the United States, and shall be distributed as in the case of proceeds of property condemned as prize.”\*

English rule. The rule observed by the English courts is stated by Chitty to be the same in principle as the law of the United States.†

Sec. 18. Treaty agreements. The United States have treaty agreements with several powers that ships and other property taken by pirates, and found within the jurisdiction of either party, shall be restored to the original owners. It is stipulated generally that the claim for restitution shall be made within one year. The treaties with Spain, Muscat, and Sweden and Norway do not limit the time of making claims for restitution.

These treaties are with Bolivia, 1858; Brazil, 1828; United States of Colombia, 1846; Ecuador, 1839; Italy, 1871; Guatemala, 1849; Mexico, 1848; Muscat, 1833; San Salvador, 1850; Spain, 1795; and Sweden and Norway, 1827.‡ The latter treaty also stipulates that when the vessels of either party, being neutral, are captured by an enemy and recaptured by the vessels of war or privateers of the other, being a belligerent, they shall be restored to the original owners on proper proof. The same treaty, and that with Prussia of 1799, revived in part by the treaty of 1828, contain special agreements as to salvage where the parties may be engaged in a joint war.§

Sec. 19. Rescue and recapture.

“Rescue and recapture are distinguishable from each other. The term recapture is ordinarily employed when a prize, having been captured by an enemy, is recovered from his possession by the arrival of a friendly force. The term rescue more usually denotes that recovery which is effected by the rising of the captured party himself against his captor. There is, however, another kind of rescue, which partakes of the nature

\* Rev. Stat. U. S., Sec. 4652.

† Vattel, p. 385, n.

‡ U. S. Treaties, 1873, “Bolivia,” &c.

§ U. S. Treaties, 1873, “Prussia,” p. 721.



of recapture : it occurs where the weaker party, before he is overpowered, obtains relief from the arrival of fresh succors, and is thus preserved from the force of the enemy.”\*

“ It is no objection to an allowance of salvage, or a recapture, that it was made by a non-commissioned vessel ; it is the duty of every citizen to assist his fellow-citizens in war, and to retake their property out of the enemy’s possession ; and no commission is necessary to give a person so employed a title to the reward which the law allots to that meritorious act of duty. And if a convoying ship recaptures one of the convoy, which has been previously captured by the enemy, the recaptors are entitled to salvage. But a mere rescue of a ship engaged in the same common enterprise gives no right to salvage.

“ To entitle a party to salvage, as upon a recapture, there must have been an actual or constructive capture ; for military salvage will not be allowed in any case where the property has not been actually rescued from the enemy. But it is not necessary that the enemy should have actual possession ; it is sufficient if the property is completely under the dominion of the enemy. If, however, a vessel be captured going in distress into an enemy’s port, and is thereby saved, it is merely a case of *civil* and not of *military* salvage. But to constitute a recapture, it is not necessary that the recaptors should have a bodily and actual possession ; it is sufficient if the prize be actually rescued from the grasp of the hostile captor. Where a hostile ship is captured, and afterwards recaptured by the enemy, and again recaptured from the enemy, the original captors are not entitled to restitution on paying salvage, but the last captors are entitled to the whole rights of the prize ; for, by the first recapture, the right of the original captors is entirely divested. Where the original captors have abandoned their prize, and it is subsequently captured by other parties, the latter are solely entitled to the property. But if the abandonment be involuntary, and produced by the terror of superior force, and especially if produced by the act of the second captors, the rights of the original captors are completely revived. And where the enemy has captured a ship and afterwards deserted the captured vessel, and it is then recaptured, this is not to be considered as a case of derelict ; for the original owner never had the *animus*

\* Lawrence’s Wheaton, p. 668, n.

*delinquendi*, and therefore it is to be restored on payment of salvage; but as it is not strictly a recapture within the Prize Act, the rate of salvage is discretionary. But if the abandonment by the enemy be produced by the terror of hostile force, it is a recapture within the terms of the act. Where captors abandon their prize, and it is afterwards brought into port by neutral salvors, it has been held that the neutral Court of Admiralty has jurisdiction to decree salvage, but cannot restore the property to the original belligerent owners; for by the capture, the captors acquired such a right of property as no neutral nation can justly impugn or destroy, and consequently the proceeds (after deducting salvage) belong to the original captors, and neutral nations ought not to inquire into the validity of a capture between belligerents. But if the captors make a donation of the captured vessel to a neutral crew, the latter are entitled to a remuneration as salvors; but after deducting salvage, the remaining proceeds will be decreed to the original owner. And it seems to be a general rule, liable to but few exceptions, that the rights of capture are completely divested by a hostile recapture, escape or voluntary discharge of the captured vessel. And the same principle seems applicable to a *hostile* rescue; but if the rescue be made by the *neutral* crew of a neutral ship, it may be doubtful how far such an illegal act, which involves the penalty of confiscation, would be held in the prize courts of the captor's country to divest his original right in case of a subsequent recapture.”\*

“As to recaptors, although their right to salvage is extinguished by a subsequent hostile recapture and regular sentence of condemnation, divesting the original owners of their property, yet if the vessel be restored upon such recapture, and resume her voyage, either in consequence of a judicial acquittal or a release by the sovereign power, the recaptors are reintegrated in their right of salvage. And recaptors and salvors have a legal interest in the property, which cannot be divested by other subjects without an adjudication in a competent court; and it is not for the government's ships or officers, or other persons, upon the ground of superior authority, to dispossess them without cause.

“In all cases of salvage where the rate is not ascertained by

\* Lawrence's Wheaton, pp. 664-5.

positive law, it is in the discretion of the court, as well upon recaptures as in other cases. And where, upon a recapture, the parties have entitled themselves to a *military* salvage, under the Prize Act, the court may also award them, in addition, a civil salvage, if they have subsequently rendered extraordinary services in rescuing the vessel in distress from the perils of the seas.”\*

According to English law, where the captured vessel has been fitted out and employed as a vessel of war of the enemy, the title of the original owners is not revived by recapture, but she is decreed a lawful prize to the recaptors. The Prize Act of 1800, of the United States, provided for salvage, in such case, of one-half the value of the vessel, where the recapture was made by a privateer, and of one-fourth if it was made by a vessel of war of the United States.†

Prizes commissioned as vessels of war.

“What constitutes a *setting forth as a vessel of war* has been determined by the British Courts of Prize, in cases arising under the clause in the Act of Parliament, which may serve for the interpretation of our own law, as the provisions are the same in both. Thus it has been settled that where a ship was originally armed for the slave trade, and after capture an additional number of men were put on board, but there was no commission of war and no additional arming, it was not a setting forth as a vessel of war under the act. But a commission of war is decisive if there be guns on board. And where the vessel, after the capture, has been fitted out as a privateer, it is conclusive against her, although when recaptured she is navigating as a mere merchant ship; for where the former character of a captured vessel had been obliterated by her conversion into a ship of war, the legislature meant to look no further, but considered the title of the former owner forever extinguished. Where it appeared that the vessel had been engaged in the military service of the enemy, under the direction of his minister of the marine, it was held as a sufficient proof of a setting forth as a vessel of war. So where the vessel is armed and is employed in the public military service of the enemy by those who have competent authority to so employ it, although it be not regu-

\*Lawrence's Wheaton, p. 668.

† *Ibid.* p. 658. For a synopsis of the laws of different nations regulating salvage, see Wheaton, p. 658 *et seq.*

larly commissioned. But the mere employment in the enemy's military service is not sufficient; but if there be a fair semblance of authority in the person directing the vessel to be so employed, and nothing upon the face of the proceedings to invalidate it, the court will presume that he is duly authorized; and the commander of a single ship may be presumed to be vested with the authority as commander of a squadron."\*

Sec. 20. Effects  
of a treaty of  
peace on cap-  
tures.

"Since the *jus postliminii* does not, strictly speaking, operate after the peace; if the treaty of peace contains no express stipulation respecting captured property, it remains in the condition in which the treaty finds it, and is thus tacitly ceded to the actual possessor. The *jus postliminii* is a right which belongs exclusively to a state of war; and therefore a transfer made to a neutral before the peace, even without a judicial sentence of condemnation, is valid, if there has been no recovery or recapture before the peace. The intervention of peace covers all defects of title, and vests a lawful possession in the neutral, in the same manner as it quiets the title of the hostile captor himself.

"A treaty of peace binds the contracting parties from the time of its signature. Hostilities are to cease between them from that time, unless some other period be provided in the treaty itself. But the treaty binds the subjects of the belligerent nations only from the time it is notified to them."†

Captures made after the conclusion of a treaty of peace, but in ignorance of it, must be restored. The captor may be held responsible for damages caused by the seizure, but, if he acted in good faith, his government will assume the liability.‡

"When the treaty of peace contains an express stipulation that hostilities are to cease in a given place at a given time, and a capture is made previous to the expiration of the period limited, but with a knowledge of the peace on the part of the captor, the capture is still invalid; for since constructive knowledge of the peace, after the periods limited, in the different parts of the world, renders the capture void, much more ought actual knowledge of the peace to produce that effect. It may, however, be questionable whether anything short of an official notification from his own government would be sufficient, in such

\* Lawrence's Wheaton, p. 663.

† *Ibid.* p. 884.

‡ *Ibid.* p. 885.

a case, to affect the captor with the legal consequences of actual knowledge.”\*

Where a prize taken before the time fixed for the cessation of hostilities, and in ignorance of the peace, had not been sent into port and condemned, but was recaptured after that time by a cruiser also in ignorance of the treaty, it was held that the original captor was lawfully entitled to the prize.†

“The restoration of peace puts an end, from the time limited, to all force; and then the general principle applies, that things acquired in war remain, as to title and possession, precisely as they stood when the peace took place. The *uti possidetis* is the basis of every treaty of peace, unless the contrary be expressly stipulated. Peace gives a final and perfect title to captures without condemnation, and as it forbids all force, it destroys all hope of recovery, as much as if the captured vessel was carried *infra præsidia* and judicially condemned.”‡

\* Lawrence's Wheaton, p. 885.

† *Ibid.* p. 886.

‡ *Ibid.*



## PART IX.

### PRIVATEERING.

Sec. 1. Defini-  
tions.

Any discussion of the subject of the employment of privateers by a belligerent is of interest, rather from its historic aspect than from any practical importance it is likely to assume in future wars; the United States, Spain and Mexico being at present the only civilized nations maintaining the right to make use of privateers when engaged in war. While the right is unquestionably sanctioned by international law, it is not likely that it will be again put in force by a belligerent, as the evils that are apt to grow out of the system may be far greater than any advantages that can accrue from it. In this chapter it is proposed to give certain definitions respecting privateering, and also an account of the efforts that have been made from time to time to abolish the system entirely.

“A private armed vessel or privateer is a vessel owned and officered by private persons, but acting under a commission from the State, usually called letters of marque. It answers to a company on land raised and commanded by private persons, but acting under rules from the supreme authority, rather than to one raised and acting without a license, which would resemble a privateer without commission. The commission, on both elements, alone gives a right to the thing captured, and insures good treatment for the enemy. A private vessel levying war without such license, although not engaged in a piratical act, would fare badly in the enemy's hands.

“The right to employ this kind of extraordinary naval force is unquestioned, nor is it at all against the usage of nations in times past to grant commissions even to privateers owned by aliens.”\*

Although the custom of issuing commissions to foreigners to cruise against an enemy has obtained at times, it was always

\* Woolsey, Sec. 121.

condemned on the ground that the persons accepting such commissions were actuated solely by a desire for plunder, and is now prohibited even by those nations that still adhere to the right to employ privateers. And the municipal laws of nearly all nations forbid their subjects accepting such commissions from a belligerent.

"As subjects are not under an obligation of scrupulously weighing the justice of the war, which indeed they have not always an opportunity of being thoroughly acquainted with, and respecting which they are bound, in case of doubt, to rely upon the sovereign's judgment, they unquestionably may with a safe conscience serve their country by fitting out privateers, unless the war be evidently unjust. But, on the other hand, it is an infamous proceeding on the part of foreigners to take out commissions from a prince, in order to commit piratical depredations on a nation which is perfectly innocent with respect to them. The thirst for gold is their only inducement; nor can the commission they have received efface the infamy of their conduct, though it screens them from punishment."\*

In the United States the authority to employ privateers is by the Constitution conferred upon Congress, and it is exercised by the passage of an act empowering the President to issue letters of marque and general reprisals against the enemy.

Sec. 2. Authority to employ privateers.

Certain necessary restrictions, varying with the municipal laws of nations, have nearly always been placed on privateering. The laws of some States regulated the composition of the crews of privateers, and prohibited their cruising in the rivers or within the marine jurisdiction of the enemy; such laws, however, never formed a part of international law, nor even of general usage.†

Sec. 3. Restrictions on privateers.

"Before giving a privateering commission, it is usual for the government issuing it to require the lodgment of caution money or the execution of a bond, by way of security against illegal conduct on the part of the holder, and against a breach of the instructions which are issued for his guidance. The commission is revocable on proof of its misuse being produced, and by English law at least the owners of the vessel were liable in damages; it was also usual for the Lords of the Admiralty to institute proceedings in the Admiralty Court upon complaint of

\* Vattel, p. 400.

† Martens, Essay on Privateers, Chap. II, Sec. 18.

ill-conduct. As a further safeguard, a privateer is liable to visit by public vessels of war; and as she is not invested with a public character, neutral ships of war are permitted to verify the lawfulness of the commission under which she sails by requiring its production.”\*

It is stipulated in many treaties that the subjects of the contracting parties shall be prohibited from taking out letters of marque from a third nation at war with either country, and that all persons violating this stipulation may be held and treated as guilty of piracy. The United States have concluded several such treaties, generally with South American States.†

“In the absence of such treaties, a neutral may with impunity accept a military commission from a belligerent for sea or land service. But municipal law often forbids the citizen or subject to take this step.”‡ The third section of the Act of Congress of April 20, 1818, prohibits the fitting out of privateers by any one, whether a citizen or an alien, within the limits of the United States, to cruise against a nation in amity with the United States. The punishment for such offence is fine and imprisonment of the offenders, and confiscation of the vessel and her equipments.

Sec. 4. When privateers are treated as pirates.

“The offence of depredating under commissions from different sovereigns at war with each other is clearly piratical, since the authority conferred by one is repugnant to the other; but it has been doubted how far it may be lawful to cruise under commissions from different sovereigns allied against a common enemy. The better opinion, however, seems to be, that although it might not amount to the crime of piracy, still it would be irregular and illegal, because the two co-belligerents may have adopted different rules of conduct respecting neutrals, or may be separately bound by engagements unknown to the party.”§ Hautefeuille states that the officers of privateers sailing under commissions from different sovereigns, even when allied, are treated as pirates.||

“On the other hand, it is not held to be piracy if a privateer or other armed vessel, exceeding its commission, prey upon commerce admitted by its sovereign to be friendly. Offences

\* Hall, p. 453.

† U. S. Treaties, 1873, Ecuador, Brazil, etc.

‡ Woolsey, Sec. 123, comp. “Neutrality.”

§ Lawrence’s Wheaton, p. 250.

|| Hautefeuille, Vol. I, p. 190.

of this kind entitle the injured party to compensation, but the jurisdiction belongs to the vessel's sovereign, who is responsible for the conduct of his officers."\*

"It must probably be considered as a remnant of the barbarous practices of those ages when maritime war and piracy were synonymous, that captures made by private armed vessels, without a commission, not merely in self-defence, but even by attacking the enemy, are considered lawful, not indeed for the purpose of vesting the enemy's property thus seized in the captors, but to prevent their conduct from being regarded as piratical, either by their own government or by the other belligerent State. Property thus seized is condemned to the government as prize of war, or, as these captures are technically called, *Droits of Admiralty*. The same principle is applied to the captures made by armed vessels commissioned against one power, when war breaks out with another; the captures made from that other are condemned, not to the captors, but to the government."†

Sec. 5. Captures by non-commissioned vessels.

"Although no one is permitted to fit out a privateer without letters of marque, every merchantman is allowed to arm himself in order to defend himself in cases of necessity; in that case, however, he not only has not the right of acting offensively; but supposing also that, in defending himself, he takes a prize from the enemy, he has, in strictness, no right to demand an adjudication of it; it devolves to the State, unless any particular law grants it to him. This is the reason why, at present, merchant ships often procure letters of marque, in order to make use of them when occasion offers, as well in the defensive as in the offensive. These ships, therefore, may be laden with merchandise, while properly a privateer cannot have any mercantile cargo."‡

The first article of the Declaration of Paris of 1856, that "privateering is and remains abolished," is binding only on those governments acceding to it, and can have no effect as against nations not parties to that declaration. That declaration is "only a pledge, on the part of the States adhering to it, not to issue commissions for that purpose, and does not of itself create any new offence against the law of nations; while the admission

Sec. 6. Treatment of privateers.

\* Woolsey, Sec. 137.

† Lawrence's Wheaton, p. 627 and *n.*

‡ Martens, Chap. II, Sec. 12, and *n.*, p. 41.

of the Congress, made at the suggestion of the Russian plenipotentiaries, that it would not be obligatory on the signers of the declaration to maintain the principle of the abolition of privateering against those which did not accede to it, received a practical construction in the course adopted by England and France, and other countries, in their declarations with regard to the Civil War in the United States.”\*

Privateers may, of course, still be employed by the signatories of the Declaration of Paris against those nations which maintain the right of privateering.†

“Belligerent ships of war, privateers, and the prizes of either, are entitled, on the score of humanity, to temporary refuge in neutral waters from the casualties of the sea and war. By the law of nations, belligerent ships of war, with their prizes, enjoy asylum in neutral ports, for the purpose of obtaining supplies or undergoing repairs, according to the discretion of the neutral sovereign, who may refuse the asylum absolutely, or grant it under such conditions of duration, place or other circumstances as he shall see fit, provided that he must be strictly impartial in this respect towards all the belligerent powers. Where the neutral State has not signified its determination to refuse the privilege of asylum to belligerent ships of war, privateers, or their prizes, either belligerent has a right to assume its existence, and enter upon its enjoyment, subject to such regulations and limitations as the neutral State may please to prescribe for its own security.”‡

Asylum granted  
to privateers.

Many governments have made a distinction as to the right of asylum between public vessels of war and privateers, allowing the latter to enter their ports only in cases of distress from want of provisions, damages caused by gales of wind, or actual pursuit by an enemy.§ This was the rule generally adopted by neutrals in their declarations with respect to the War of Secession in the United States.

On this point the United States Minister at Turin was assured by Count Cavour, in March, 1857, that, should the United States not accede to the Declaration of Paris, their privateers would

\* Lawrence's Wheaton, p. 255, *n*.

† Hall, p. 454.

‡ Opinion of Attorney-General Cushing, in the case of the *Sitka*, quoted by Mr. Lawrence, Wheaton, p. 726.

§ Hautefeuille, Vol. I, p. 380.



always have the right of asylum in Sardinian ports, but that it was questionable whether they would be allowed to sell prizes there, or to make such ports a basis of operations against the enemy. The latter questions are no longer in doubt, such actions being absolutely prohibited.\*

A statement was made to Parliament by Lord John Russell, in June, 1861, that orders had been given to the authorities in the ports of the United Kingdom, and to the governors of the colonies, not to allow the entrance of ships of war or privateers with their prizes into any British port.†

The treatment of privateersmen commissioned by a *de facto* government established by persons in rebellion, when captured by the sovereign power, has been noticed in the chapter on Reprisals.

The advantages claimed for the system of privateering are: Sec. 7. Advantages claimed for privateering.  
 1. A nation which possesses only a small naval force is enabled, in case of war, to at once put afloat a large number of armed cruisers to inflict damage on an enemy's commerce, at no cost to the State; 2. The vessels of the merchant marine are in this way made of service to government, and their crews find employment and gain a livelihood of which they would otherwise be deprived by the operations of the war; and 3. A weak naval power may, by employing its merchant ships as cruisers, approach an equality at sea with an enemy having a powerful fleet, and, by such a menace to commerce, protect itself from possible aggression.‡

"Unless the government is entirely separated from the individuals of the nation, and war confined to the former, the effect of surrendering the right of granting commissions to private armed cruisers would be to place the commerce of the world at the mercy of the power having the greatest military marine."§

While the advantages to be obtained at times by the employment of privateers are unquestionably very great, the evils attending the system have led many writers to condemn it and to urge its abandonment. Sec. 8. Evils attending privateering.

"Privateering, under all the restrictions which have been adopted, is very liable to abuse. The object is not fame or

\* Lawrence's Wheaton, p. 642, *n.*

† See "Neutrality."

‡ Woolsey, Sec. 121.

§ Lawrence's Wheaton, p. 640, *n.*

chivalric warfare, but plunder and profit. The discipline of the crews is not apt to be of the highest order, and privateers are often guilty of enormous excesses, and become the scourge of neutral commerce. . . . The efforts to stop the practice have been very feeble and fruitless, notwithstanding that enlightened and enlarged considerations of national policy have shown it to be for the general benefit of mankind to surrender the licentious practice, and to obstruct as little as possible the freedom and security of commercial intercourse among the nations.”\*

Wheaton says of privateering: “This practice has been justly arraigned as liable to gross abuses, as tending to encourage a spirit of lawless depredation, and as being in glaring contradiction to the more mitigated modes of warfare practised on land.”†

The evils are increased where privateers are permitted the exercise of belligerent rights with respect to neutral vessels, and the system may become a source of danger to the belligerent employing them. Serious complications with neutrals may arise from abuses committed through ignorance of the reciprocal rights and duties of belligerents and neutrals, or the rapacity of the privateersmen.

Sec. 9. Efforts made to abolish privateering.

Although the United States have, on both occasions of being engaged in maritime war, made use of privateers to inflict great damage on the enemy's commerce, the government has been, from its foundation, a consistent advocate of the abolition of privateering, and of the consequent proposition, the immunity of private property at sea from seizure. The treaty of 1785 with Prussia, drawn up by Dr. Franklin, contained a prohibition of privateering as between the two parties, and guaranteed the immunity of private property at sea.‡ On the revision of this treaty in 1799, however, these stipulations were omitted.

The same propositions, which were considered inseparable, had been urged by the American representatives in negotiating the provisional treaty of 1782 with Great Britain, and the definitive treaty of 1783, which recognized the independence of the United States, but without success.

Declaration of Paris, 1856.

While several European nations had at various times made agreements looking to the suppression of privateering, no general movement in this direction was made prior to the Paris

\* Kent, Vol. I, p. 107.

† Lawrence's Wheaton, p. 628.

‡ U. S. Treaties, 1873, p. 713.

Conference of 1856, following the Crimean War. At that conference a declaration of principles to be observed by belligerents was signed on April 16th by the plenipotentiaries of all the powers represented, and the adhesion of all other powers was invited. The declaration contained four articles: "1. That privateering is and remains abolished; 2. That the neutral flag covers the cargo of the enemy, except where it is contraband of war; 3. That neutral goods, except contraband of war, are not seizable under the enemy's flag; 4. Finally, that blockades, to be obligatory, are to be effective—that is to say, maintained by a sufficient force to shut out the access of the enemy's ships and other vessels in reality."

"It was agreed by the plenipotentiaries, and inserted in the protocol of their proceedings, though not in the instrument itself, that the declaration was indivisible, and that the powers that signed it, or should accede to it, could not thereafter enter into any arrangement in regard to the application of maritime law in time of war which did not rest upon the four principles."\*

This declaration was promptly acceded to by civilized nations, with the exceptions already noticed. The ground taken by the United States in declining to accede to the declaration was that it did not secure the immunity of private property at sea, which would still be exposed to capture by public armed vessels. Mr. Marcy, in July, 1856, proposed as an amendment to the privateer clause of the declaration, that "the private property of the subjects or citizens of a belligerent on the high seas shall be exempted from seizure by public armed vessels of the other belligerent, except it be contraband of war." Mr. Marcy's proposed amendment.

President Pierce, in his Message to Congress in December, 1856, stated clearly the position of the United States in regard to privateering. He said: "I certainly cannot ascribe to the powers represented in the Congress at Paris any but liberal and philanthropic views in the attempt to change the unquestionable rule of maritime law in regard to privateering. Their proposition was doubtless intended to imply approval of the principle that private property upon the ocean, although it might belong to citizens of a belligerent State, should be exempted from capture; and had that proposition been so formed as to give full effect to the principle, it would have received my ready

\* Lawrence's Wheaton, p. 637, *n*.

assent on behalf of the United States. But the measure proposed is inadequate to that end. Private property would still be left to the depredations of armed cruisers.”\*

The majority of the powers that formulated the Declaration of Paris soon recognized the necessity of the proposed amendment to give it full effect, and readily agreed to accede to it should it be made the subject of discussion among the powers. The only objections seemed to come from Great Britain, and these objections were stated by Lord Palmerston in a debate in the House of Commons in March, 1862. “He denied that the exemption of private property by sea from capture was a logical deduction from the ‘declaration,’ which related entirely to the relations between belligerents and neutrals. The present proposition related to the relations of belligerents with each other. He intimated that he no longer entertained the views as expressed by him at Liverpool in 1856. His (present) opinion distinctly was, that if you give up that power which you possess, and which all maritime States possess and have exercised—of taking the ships, the property and the crews of the nation with whom you may happen to be at war—you would be crippling the right arm of our strength; you would be inflicting a blow upon our naval power, and you would be guilty of an act of political suicide.”†

In April, 1857, the proposal of the United States was withdrawn by Mr. Buchanan’s administration, and since that time no action has been taken by our government to secure a general adoption of the principle of immunity of private property at sea from capture. In 1858 Brazil proposed that “all private property, without exception of merchant vessels, should be placed under the protection of maritime law, and be free from the attacks of cruisers of war.”‡ The subject was subsequently discussed in Europe, but no action was taken.

In April, 1861, Mr. Seward offered, on the part of the United States, to accept the Declaration of Paris as it stood, but expressed, at the same time, a preference for the amendment proposed by Mr. Marcy. Great Britain and France, having recognized the Confederate States as belligerents, declined to accept the renunciation of privateering on the part of the United

\* Pres. Mess. and Docs., 1856-57, pp. 22-35.

† Lawrence’s Wheaton, p. 647, *n.*

‡ *Ibid.* p. 642.

States, unless it was accompanied by a declaration that it should have no bearing on the differences then prevailing in the United States. The object in requiring this special declaration was fully explained by those governments. Had they accepted the proposition of the United States without such a declaration, they would have been called upon to treat as pirates any Confederate privateers entering their ports. The Confederate Congress, by a resolution of August 13, 1861, adopted the last three articles of the Declaration of Paris, but declared that "we maintain the right of privateering, as it has been long established by the practice and recognized by the law of nations."\*

As the offer made on the part of the government was intended, of course, to be binding on all citizens of the United States, whether in rebellion or not, the special declaration was considered inadmissible; and the United States Minister to France was instructed, in September, 1861, in case it was still insisted upon, to desist from further discussion of the subject. Since that time it has not been formally reopened. No advantage would have been gained by the United States had the proposition made by Mr. Seward been accepted, as, with the exception of a few small vessels fitted out as privateers early in the war to act on our own coast, all the Confederate cruisers were commissioned as public vessels of war, commanded by officers of the regular naval service established by the Confederate States.

In the discussion of a bill before Congress in the winter of 1861, to authorize the President to issue letters of marque against the seceded States, Mr. Sumner, who was strongly opposed to its passage, suggested, as a substitute, that the Secretary of the Navy should be authorized to charter such vessels as might be needed for the naval service and place them under command of officers commissioned by the United States. This suggestion was carried into effect by the purchase of several hundred merchant vessels suitable for duty on the blockade, and the appointment from civil life of a large number of officers who became, for the time, a part of the naval establishment of the country. In this way the question of privateering was settled, and although an act was passed by Congress in 1863 authorizing the issuance of letters of marque and reprisals in all foreign and domestic wars, no privateers were commissioned under it.

\* Lawrence's Wheaton, p. 778, n.



Sec. 10. Conduct  
of nations in  
late wars.

Of the right of taking enemy's property at sea, and the proposition to abandon it entirely by a general agreement among nations, a late writer says: "In face of the results that maritime capture has often produced, it is idle to pretend that it is not among the most formidable of belligerent weapons; and in the face of obvious facts it is equally idle to deny that there is no weapon the use of which causes so little individual misery.

"Legally and morally only one conclusion is possible, viz. that any State which chooses to adhere to the capture of private property at sea has every right to do so." But the same writer also says: "The question whether it is wise for States in general, or for any given State, to agree as a matter of policy to the abolition of the right of capture of private property at sea, is of course entirely distinct from the question of right. It may very possibly be for the common interests that a change in the law should take place."\*

While the right of capturing the private property of enemies at sea is one undoubtedly sanctioned by the law of nations, the tendency to exempt from capture vessels engaged in lawful trade is ever growing stronger. This has been shown in a marked manner by the course pursued by some of the nations of Europe that have been engaged in war since the Declaration of Paris.

In the war between Austria and Prussia and Italy, in 1866, the Austrian government published a decree on May 13, 1866, exempting merchant vessels of the enemy from capture, on condition that a like course was observed by the other belligerents. Both Prussia and Italy published similar decrees. At the commencement of the Franco-Prussian War of 1870, the King of Prussia published a decree exempting from capture merchant ships of the enemy without any condition as to reciprocity, but in consequence of France continuing to exercise the right of capture of private property at sea, the Berlin decree was revoked January 19, 1871. During the Russo-Turkish War of 1876-77, private property at sea was respected by the belligerents.

These cases are not sufficient to establish any usage, and cannot even be regarded as binding those nations to a like observance in future wars, but they show the modern tendency

\* Hall, p. 380 and n.

to confine the operations of war to governments, and to exempt individuals as far as possible from its hardships.

One of the latest treaties regulating commerce entered into by the United States, that with Italy in 1871, adopts the principle of immunity of private property from capture at sea. Article XII of the treaty is as follows: "The high contracting parties agree that, in the unfortunate event of war between them, the private property of their respective citizens and subjects, with the exception of contraband of war, shall be exempt from capture or seizure, on the high seas or elsewhere, by the armed vessels or by the military forces of either party; it being understood that this exemption shall not extend to vessels and their cargoes which may attempt to enter a port blockaded by the naval forces of either party."\* The same treaty provides that any private property taken during war for the use of the military forces of either party shall be paid for at a reasonable price.

Sec. 11. Treaty  
between the  
United States  
and Italy.

That the powers acceding to the Declaration of Paris may, if they choose, evade the operation of the privateer clause was seen during the Franco-Prussian War. Prussia, in August, 1870, decreed the formation of a volunteer navy. Owners of merchant vessels were invited to fit them out to attack French ships of war, and premiums were offered for the destruction of the latter. The crews were to be furnished by the owners of the vessels, and the officers were to receive temporary commissions and wear the naval uniform, but were to form no part of the navy, although they might receive commissions in the navy for special services. France protested against this, as an evasion of the principles of the Declaration of Paris, and addressed a note on the subject to the British government. The law officers of the Crown reported that there were substantial differences between a volunteer naval force, such as that proposed by Prussia, and the privateers suppressed by the declaration, and Great Britain declined to make any objection. Although Prussia had, at the beginning of the war, announced her intention not to capture private property at sea, this announcement was withdrawn in January, 1871; and had a volunteer navy been formed it would have been, after that time, authorized to capture private property of the enemy, as it is certain that no nation adhering

Sec. 12. Volun-  
teer naval  
forces.

\* U. S. Treaties, 1875, "Italy," p. 506.

to the right of making such captures would confine its exercise to public armed vessels and employ a temporary naval force against the armed vessels of the enemy.

Mr. Hall says on this subject: "The sole real difference between privateers and a volunteer navy is then that the latter is under naval discipline, and it is not evident why privateers should not also be subjected to it. It cannot be supposed that the Declaration of Paris was merely intended to put down the use of privateers governed by the precise regulations customary up to that time. Privateering was abandoned because it was thought that no armaments maintained at private cost, with the object of private gain, and often necessarily for a long time together beyond the reach of the regular naval forces of the State, could be kept under proper control. Whether this belief was well founded or not is another matter. It may be that the organization intended to be given to the Prussian volunteer navy, or some analogous organization, would possess sufficient safeguards. If so, there could be no objection on moral grounds to its use; but unless a volunteer navy were brought into closer connection with the State than seems to have been the case in the Prussian project, it would be difficult to show that its establishment did not constitute an evasion of the Declaration of Paris.

"The incorporation of a part of the merchant marine of a country into its regular navy is of course to be distinguished from such a measure as that above discussed."\*

The course taken by the United States in 1861-65 would be open to no objection. The crews of the vessels were regularly enlisted for the naval service, and the volunteer officers, although holding temporary appointments only, were in all that related to rank and duty officers of the United States Navy.

\* Hall, p. 455.

## PART X.

### P I R A C Y.

"With piracy the law of nations has to do, as it is a crime, Sec. 1. Definition. not against any particular State, but against all States and the established order of the world."\*

"Piracy is defined by the text-writers to be the offence of depredating on the seas without being authorized by any sovereign State, or with commissions from different sovereigns at war with each other."†

"The various acts which are recognized or alleged to be piratical may be classed as follows :

"1. Robbery or attempt at robbery of a vessel by force or intimidation, either by way of attack from without, or by way of revolt of the crew and conversion of the vessel and cargo to their own use.

"2. Depredation upon two belligerents at war with one another under commissions granted by each of them:

"3. Depredations committed at sea upon the public or private vessels of a State, or descents upon its territory from the sea by persons not acting under the authority of any politically organized community, notwithstanding that the objects of the persons so acting may be professedly political. Strictly all acts which can be thus described must be regarded as in a sense piratical. In the most respectable instances they are acts of war which, being done in places where international law alone rules, or from such places as a base, and being therefore capable of justification only through international law, are nevertheless done by persons who do not even satisfy the conditions precedent of an attempt to become subjects of law, and who cannot consequently claim, like unrecognized political societies, to be endeavoring to establish their position as such. Often, however, the true character of the acts in question is far from cor-

\* Woolsey, Sec. 137.

† Dana's Wheaton, p. 192.

responding with their legal aspect. Sometimes they are wholly political in their objects and are directed solely against a particular State, with careful avoidance of depredation or attack upon the persons or property of the subjects of other States. In such cases, though the acts done are piratical with reference to the State attacked, they are for practical purposes not piratical with reference to other States, because they neither interfere with nor menace the safety of those States nor the general good order of the seas.”\*

Sec. 2. American  
definition of  
piracy.

The Constitution of the United States gives to Congress the power “to define and punish piracy and felonies committed on the high seas, and offences against the law of nations.”†

Under this authority several acts of Congress have been passed defining the crime of piracy and fixing penalties for its commission. By the Act of Congress of April 30, 1790, the following offences, when committed upon the high seas, in any waters not within the jurisdiction of any particular State, are made piracy punishable by death; namely, murder or robbery, or any other offence which, if committed on shore, would, by the laws of the United States, be punishable by death. It is also piracy if the captain or crew of any vessel shall feloniously run away with such vessel, or any goods or merchandise to the value of fifty dollars, or shall deliver their ship to pirates. Mutiny on board a merchant ship is made piracy, as is also preventing by force the captain of a vessel from defending his ship and the goods committed to his trust.

It is made piracy to wilfully cast away, burn, or otherwise destroy any ship or vessel belonging to citizens of the United States, or to procure the doing of the same. Conspiracy to destroy any vessel with intent to defraud the underwriters is made piracy punishable by death.

Any person who shall in any way, either on land or at sea, assist or advise persons to commit any of the offences named in the act shall suffer death; and all persons who shall, after the commission of any piracy, receive, entertain, or conceal the offenders, or shall receive any ship or goods which have been piratically taken, shall be punished by fine and imprisonment as accessory to such piracy.

\* Hall, p. 219. For a valuable and interesting discussion of what constitutes piracy, see Dana's Wheaton, p. 193, *n.*

† Article I, Section VIII.



Several minor offences are made piracy, but are punishable by fine and imprisonment only.\*

Any citizen who commits any act of hostility against the United States, under color of any commission from any foreign prince or State, shall, notwithstanding the pretence of such authority, be deemed a pirate, and on conviction shall suffer death.†

The Acts of Congress of May 15, 1820; March 3, 1825; March 3, 1835; August 8, 1846; March 3, 1847, and July 29, 1850, all relate to the same subject, and by their provisions the penalty in some cases is reduced; the same definition of piracy, however, being retained.

"Pirates being the common enemies of all mankind, and all nations having an equal interest in their apprehension and punishment, they may be lawfully captured on the high seas by the armed vessels of any particular State, and brought within its territorial jurisdiction for trial in its tribunals.

Sec. 3. Limitations to the definition of piracy.

"This proposition, however, must be confined to piracy as defined by the law of nations, and cannot be extended to offences which are made piracy by municipal legislation. Piracy, under the law of nations, may be tried and punished in the courts of justice of any nation by whomsoever and wheresoever committed; but piracy created by municipal statute can be tried only by that State within whose territorial jurisdiction and on board of whose vessels the offence thus created was committed. There are certain acts which are considered piracy by the internal laws of a State, to which the law of nations does not attach the same signification.

"The crimes of murder and robbery, committed by foreigners on board of a foreign vessel on the high seas, are not justiciable in the tribunals of another country than that to which the vessel belongs; but if committed on board of a vessel not at the time belonging, in fact as well as right, to any foreign power or its subjects, but in possession of a crew acting in defiance of all law, and acknowledging obedience to no flag whatsoever, these crimes may be punished as piracy, under the law of nations, in the courts of any nation having custody of the offenders."‡

\* Brightley's Digest, pp. 207-8.

† *Ibid.* p. 208.

‡ Dana's Wheaton, pp. 193-4.

Sec. 4. Taking  
letters of marque  
by neutrals.

The Act of Congress of March 3, 1847, provides that any citizen or subject of a foreign State who shall be found and taken on the high seas, making war upon the United States, and cruising against the vessels and property thereof, or of the citizens of the same, contrary to the provisions of any treaty existing between the United States and the State of which such person is a citizen or subject, when by such treaty the acts of such person are declared to be piracy, may be tried, convicted and punished by a Circuit Court of the United States in the same manner as other persons charged with piracy.

The treaties of the United States now in force, by which the citizens of either party, being neutral, taking out letters of marque against the other, are declared to be pirates, are those with the United States of Colombia, 1846; Ecuador, 1839; Guatemala, 1849; Prussia, 1828; San Salvador, 1850; Spain, 1795; Sweden and Norway, 1827.\* Similar stipulations were contained in treaties with Great Britain, France, Brazil, Chile, The Netherlands, and Peru, but the treaties are now obsolete.

No treaty containing such a stipulation has been entered into by the United States since 1850, and in 1854 the government expressed itself as disinclined to enter into any new agreements of this nature. The later treaties provide that such persons shall be tried and punished by the laws of the respective countries.†

Sec. 5. Instruc-  
tions to U. S.  
naval officers.

An Act of Congress of March 3, 1819, authorized the President of the United States to instruct the commanders of the public armed vessels of the government to seize and send into port any vessel the crew of which shall have committed or attempted any act of piracy upon any vessel of the United States, or the citizens thereof, or upon any other vessel; and also to retake any vessel of the United States, or its citizens, which may have been unlawfully captured upon the high seas. The same act authorized the crews of merchant ships to capture and send into port any piratical vessel, and to retake any vessel of the United States, or its citizens, which may have been unlawfully captured.‡

Sec. 6. Right of  
search.

"The right of search on suspicion of piracy is a war right, and may be exercised by public vessels anywhere, except in the

\* U. S. Treaties, 1873, Colombia, Ecuador, etc.

† *Ibid.*, "Bolivia," p. 87.      ‡ Brightley's Digest, p. 654.

waters of another State, because pirates are the enemies of the human race, at war with all mankind.”\*

“The punishment of piracy depends on the municipal law of the State where the offence is tried: the established penalty is death.”† Piratical vessels captured and sent into ports of the United States are to be condemned and sold, the proceeds to be distributed at the discretion of the court having jurisdiction in the case.‡

“Piracy is an offence within the criminal jurisdiction of nations. It is against all and punished by all; and the plea of *autrefois acquit*, resting on a prosecution instituted in the courts of any civilized State, would be a good plea in any other civilized State.”§

“As pirates acquire no title to what they take, on recapture it reverts to the proprietor without application of the rule of postliminy.”||

“The owner has merely been deprived of his possession, to which he is restored by the recapture. For the service thus rendered to him the recaptor is entitled to a remuneration in the nature of salvage.”¶

“A body of pirates may be organized under law, but it is no State, being associated for temporary purposes, and designed to act unjustly by its very existence. A State might arise out of a nest of pirates, but it would not begin to be a State until it had laid aside its piratical character. Thus it has been doubted whether the Barbary powers were anything more than associations of pirates. But having grown in the course of time more just and civilized, they are taken into the community of nations.”\*\*

“The officers and crew of an armed vessel, commissioned against one nation and depredating upon another, are not liable to be treated as pirates in thus exceeding their authority. The State by whom the commission is granted, being responsible to other nations for what is done by its commissioned cruisers, has the exclusive jurisdiction to try and punish all offences committed under color of its authority.”††

\* Woolsey, Sec. 195.

† Brightley's Digest, p. 654.

‡ Woolsey, Sec. 137.

\*\* Woolsey, Sec. 36.

† *Ibid.* Sec. 137.

§ Kent, Vol. I, p. 197.

¶ Dana's Wheaton, p. 456.

†† Lawrence's Wheaton, p. 247.

Sec. 7. Punishment for piracy.

Acquittal.

Sec. 8. Captures by pirates.

Sec. 9. Can pirates form a state?

Sec. 10. Depredating on a nation at peace.

Sec. 11. The  
slave trade.

The Act of Congress of May 15, 1820, makes engaging in the African slave trade by any citizen of the United States, either on board of an American vessel or one under any foreign flag, piracy, punishable by death.\*

The African slave trade is made piracy by the laws of Great Britain, and by treaties between Great Britain and Austria, Prussia, and Russia, but is not piracy by the law of nations.†

\* Brightley's Digest, p. 842.

† Lawrence's Wheaton, p. 256.

## PART XI.

### NEUTRAL RIGHTS AND DUTIES.

“The rights of neutrals have grown up to be an important part of international law in modern times. The ancients put the rights of war foremost, and the neutral stood chiefly in the passive relation of non-interference. This was owing, in part, to the fact that a system of confederations united the States of antiquity together in war, so that few prominent powers stood aloof from the struggles in which their neighbors were engaged, and in part to the small importance of neutral interests. Things have put on a new shape with the growth of wide intercourse, especially by sea; and with the spread of one code of public law over so many powerful States of the world, who, when they have stood aloof from war, have created for themselves rights, or secured the acknowledgment of existing ones. Now, when a war arises between two States, the interests of all neutrals are more affected than formerly; or, in other words, neutral power has increased more than war power, and the tendency is more and more towards such alterations of the code of war as will favor neutral commerce.”\* Sec. 1. Definitions.

“Neutral nations are those who, in time of war, do not take any part in the contest, but remain common friends to both parties, without favoring the arms of the one to the prejudice of the other. As long as a neutral nation wishes securely to enjoy the advantages of her neutrality, she must in all things show *a strict impartiality towards the belligerent powers*; for, should she favor one of the parties to the prejudice of the other, she cannot complain of being treated by him as an adherent and confederate of his enemy. Her neutrality would be a fraudulent neutrality, of which no nation will consent to be the dupe. It is sometimes suffered to pass unnoticed, merely for want of ability to resent it; we choose to connive at it rather than excite a more powerful opposition against us.”† Vattel.

\* Woolsey, Sec. 155.

† Vattel, p. 331.



Divisions. "There are two species of neutrality recognized by international law. There are, 1st. Natural or perfect neutrality; and 2d. Imperfect, qualified, or conventional neutrality.

Perfect neutrality. "1. Natural or perfect neutrality is that which every sovereign State has a right, independent of positive compact, to observe in respect to the wars in which other States may be engaged.

Right of neutrality. "The right of every independent State to remain at peace whilst other States are engaged in war, is an incontestable attribute of sovereignty. It is, however, obviously impossible that neutral nations should be wholly unaffected by the existence of war between those communities with whom they continue to maintain their accustomed relations of friendship and commerce. The rights of neutrality are connected with correspondent duties. Among these duties is that of impartiality between the contending parties. The neutral is the common friend of both parties, and consequently is not at liberty to favor one party to the detriment of the other. 'A neutral has nothing to do with the justice or injustice of the war; it is not for him to sit as judge between his friends who are at war with each other, and to grant or refuse more or less to the one or the other as he thinks that their cause is more or less just or unjust.'

Imperfect neutrality. "2. Imperfect, qualified, or conventional neutrality is that which is modified by special compact. The public law of Europe affords several examples of this species of neutrality."\*

Permanent neutrality. "The permanent neutrality of Switzerland, Belgium, and Cracow has thus been solemnly recognized as a part of the public law of Europe. But the conventional neutrality thus created differs essentially from that natural or perfect neutrality which every State has a right to observe, independent of special compact, in respect to wars in which other States may be engaged. The consequences of the latter species of neutrality only arise in case of hostilities. It does not exist in time of peace, during which the State is at liberty to contract any eventual engagements it thinks fit as to political relations with other States. A permanently neutral State, on the other hand, by accepting this condition of its political existence, is bound to avoid in time of peace every engagement which might prevent its observing the duties of neutrality in time of war. As an independent State it may lawfully exercise, in its inter-

\* Lawrence's Wheaton, pp. 697-9.

course with other States, all the attributes of external sovereignty. It may form treaties of amity, and even of alliance with other States; provided it does not thereby incur obligations which, though perfectly lawful in time of peace, would prevent its fulfilling the duties of neutrality in time of war. Under this distinction treaties of offensive alliance, applicable to a specific case of war between any two or more powers, or guaranteeing their possessions, are of course interdicted to the permanently neutral State. But this interdiction does not extend to defensive alliances formed with other neutral States for the maintenance of the neutrality of the contracting parties against any power by which it might be threatened with violation.”\*

“*Imperfect* neutrality may be of two kinds: it may be *impartial*, inasmuch as *both* belligerents have equal liberty to pursue the operations of war, or certain operations, such as transit of troops, purchase of military stores, enlistment of soldiers or seamen, within the neutral’s territory; or *qualified* by an anterior engagement to one of the parties, as by a covenant to furnish a contingent of troops, or to place a certain number of ships at his disposal. It is manifest that agreements like these partake of the nature of alliance. The other belligerent then is free to decide whether he will regard such a State as neutral or as an ally of his enemy. If the assistance to be rendered is trifling, and has no reference to a particular case or a war with a particular nation, it will probably be overlooked; otherwise it will expose the nation furnishing the assistance to the hostility of the other. Such was the agreement of Denmark, put into effect in 1788, in a war between Sweden and Russia, to furnish certain limited succors to the latter. Such, also, are the exclusive privileges, which may have been granted beforehand, of admitting the armed vessels and prizes of one of the belligerents into the neutral’s ports.”†

Qualified  
neutrality

Wheaton says of the case referred to above: “The abstract right of the Danish court to remain neutral, except so far as regarded the stipulated succors, was scarcely contested by Sweden and the allied mediating powers. But it is evident, from the history of these transactions, that if the war had continued, the neutrality of Denmark would not have been tolerated by these powers unless she had withheld from her ally the

\* Lawrence’s Wheaton, p. 708.

† Woolsey, Sec. 155.

succors stipulated by the treaty of 1773, or Russia had consented to dispense with its fulfilment.”\*

“Another case of qualified neutrality arises out of treaty stipulations antecedent to the commencement of hostilities, by which the neutral may be bound to admit the vessels of war of one of the belligerent parties, with their prizes, into his ports, whilst those of the other may be entirely excluded, or only admitted under limitations and restrictions. Thus, by the treaty of amity and commerce of 1778, between the United States and France, the latter secured to herself two special privileges in the American ports: 1. Admission for her privateers, with their prizes, to the exclusion of her enemies. 2. Admission for her public ships of war, in case of urgent necessity, to refresh, victual, repair, etc., but not exclusively of other nations at war with her. Under these stipulations the United States, not being expressly bound to exclude the public ships of the enemies of France, granted an asylum to British vessels and those of other powers at war with her. Great Britain and Holland still complained of the exclusive privileges allowed to France in respect to her privateers and prizes, whilst France herself was not satisfied with the interpretation of the treaty by which the public ships of her enemies were admitted into the American ports. To the former, it was answered by the American government that they enjoyed a perfect equality, qualified only by the exclusive admission of the privateers and prizes of France, which was the effect of a treaty made long before for valuable considerations, not with a view to circumstances such as had occurred in the war of the French Revolution, nor against any nation in particular, but against all nations in general, and which might, therefore, be observed without giving just offence to any.”†

On the other hand, the claim of the French Minister of the right to fit out vessels for purposes of war within the United States was not allowed by our government, it being held justly that the prohibition to arm vessels by the enemies of France, contained in the treaty of 1778, could not be construed into a permission for France to do so.‡

The treaty with France of 1778 was declared abrogated by Act of Congress July 7, 1798, since which time no treaty has

\* Lawrence's Wheaton, p. 711.

† *Ibid.*

‡ *Ibid.* p. 712.

been made by the United States granting exclusive privileges to any belligerent.

"The position of the neutral gives rise to rights which may be defended against attempted aggressions of a belligerent by armed force, and several neutrals may unite for this purpose. This is called an armed neutrality, of which the two leagues of the Baltic powers in 1780 and 1800 furnish the most noted instances. But it may be doubted whether the term neutrality can be applied to leagues like this, which not only armed themselves for self-defence, but laid down principles of public law against the known maxims of one of the belligerents, which they were ready to make good by force."\*

"It appears, then, that international usage as between belligerents and neutrals consists of two branches, distinct in respect of the parties affected, of the moral relation of these parties to each other, and of the means by which a breach of the accepted rules can be punished.

Armed  
neutrality.

The law of neutrality as regards States and individuals.

"In one the parties are sovereign States. Both of these are affected by the same duties as in peace time. The belligerent therefore remains under an obligation to respect the sovereignty of the neutral; the neutral is under an equal obligation not to aid directly or indirectly, and within certain limits to prevent a State or private persons from aiding in places under his control, the enemy of the belligerent in matters immediately bearing on the war. If a wrong is done, the remedy is of course international.

"In the other the parties are the belligerent State and the neutral individual. They are and can be bound by no obligations to each other. The only duty of the individual is to his own sovereign; and so distinctly is this the case that acts done even with intent to injure a foreign State are only wrong in so far as they compromise the nation of which the individual is a member. At the same time, the only duty of the belligerent State is to beings of like kind with itself; and it is merely bound to behave in a particular manner to the neutral individual because of the international agreement which sets limits to the severity which may be used in repressing his noxious acts. But within these limits the belligerent is irresponsible. He exacts in his own prize courts the penalty for infraction of the rules which he is

\* Woolsey, Sec. 155.

allowed to enforce; and if he inflicts a wrong, it is for him to repair it.

"This distinction between the usages affecting national and private acts is deeply rooted in the habits of nations. At no time since the rules which make up international law assumed definite shape has there been any room for question as to the existence or nature of an authoritative practice in the matter."\*

Sec. 2. Duties of neutrals.

The question is then, what specific action must the neutral State take, and what must it forbid its citizens doing? Vattel says of neutrality that it "relates solely to *war*, and includes two articles:

No assistance to belligerents.

"1. To give *no assistance* where there is no obligation to give it, nor voluntarily to furnish troops, arms, ammunition, or anything of direct use in war. I do not say 'to give assistance equally,' but 'to give no assistance'; for it would be absurd that a State should at one and the same time assist two nations at war with each other; and, besides, it would be impossible to do it with equality. The same things, the like number of troops, the like quantity of arms, of stores, etc., furnished in different circumstances are no longer equivalent succors.

Impartial conduct to be observed.

"2. In whatever does not relate to war, a neutral and impartial nation must not refuse to one of the parties, on account of his present quarrel, what she grants to the other. This does not deprive her of the liberty to make the advantage of the State still serve as her rule of conduct in her negotiations, her friendly connections, and her commerce. When this reason induces her to give preferences in things which are ever at the free disposal of the possessor, she only makes use of her right, and is not chargeable with partiality. But to refuse any of those things to one of the parties purely because he is at war with the other, and because she wishes to favor the latter, would be departing from the strict line of neutrality."†

Rules to be observed by neutrals.

From the general principles laid down by text-writers, and the authoritative usage of nations, certain rules may be deduced which a neutral State is bound to observe.

1. No military assistance must be rendered to either belligerent by the neutral State. Although some writers yet hold that assistance, in a limited degree, may be rendered to a belligerent, in accordance with antecedent treaty agreements,

\* Hall, p. 68.

† Vattel, p. 332.



such a course would be distinctly opposed to present usage. "The usage is not upheld by continuing practice, and it is not in conformity with legal principle, by which, or by practice, it could alone be rendered authoritative. It is granted that the acts contemplated would, apart from prior agreement, be a violation of neutrality as now understood, and it is unnecessary to argue that a prior agreement in no way affects the character of acts with reference to a non-consenting third party."\*

2. The neutral State must not lend money to a belligerent to assist him in his operations. But this may be done by neutral citizens with impunity. "A modern belligerent no more dreams of complaining because the markets of a neutral nation are open to his enemy for the purchase of money than because they are open for the purchase of cotton. The reason is obvious. Money is in theory and in fact an article of commerce in the fullest sense of the word. To throw upon neutral governments the obligation of controlling dealings in it taking place within their territories would be to set up a solitary exception to the fundamental rule that States are not responsible for the commercial acts of their subjects."†

Lending money  
to a belligerent.

Professor Woolsey says: "The private person, if the laws of his own State or some special treaty does not forbid, can lend money to the enemy of a State at peace with his own country, for purposes of war. The English courts, however, and our own deny that any right of action can arise out of such a loan, on the ground that it is contrary to the law of nations."‡

3. The neutral must not permit the use of any portion of his territory by a belligerent for a hostile purpose, however remote. This applies more particularly to organizing hostile expeditions within the neutral territory, arming vessels or using the neutral waters as a post of observation from which to commit hostilities. As will be noted hereafter, certain supplies may be furnished, and even necessary repairs made to the vessels of war of a belligerent, without any departure from strict neutrality.

Not to permit  
hostile use of  
territory.

"Belligerent vessels ought to remain on a strict footing of peace with all the vessels which may be in neutral ports, neither increase their crews nor their armaments, and not establish a *surveillance with the view of watching the vessels that are about to sail.*"§

\* Hall, p. 518.

† Hall, p. 520.

‡ Woolsey, Sec. 162.

§ Lawrence's Wheaton, p. 716, n.

"The respect due to neutral territorial waters is not confined to an entire abstinence from acts of hostility; it extends equally to proceedings immediately preparatory to those acts."\*

Passage of  
troops over  
territory.

4. The neutral must not, according to the present rules of international law, permit the passage of belligerent troops across his territory. Text-writers seem to be divided in opinion on this point, but the modern usage is fixed as stated. Wheaton says of the passage of an army or fleet through the territorial jurisdiction of a neutral, that it "can hardly be considered an innocent passage, such as one nation has a right to demand from another; and, even if it were such an innocent passage, is one of those *imperfect* rights, the exercise of which depends upon the consent of the proprietor, and which cannot be compelled against his will. It may be granted or withheld, at the discretion of the neutral State; but its being granted is no ground of complaint on the part of the other belligerent power, provided the same privilege is granted to him, unless there be sufficient reasons for withholding it."† Vattel expresses the same opinion.‡

On the other hand, most of the later writers of authority assert a contrary doctrine. Hautefeuille, on the ground that the service thus rendered can never be equal, denies the right of a neutral to voluntarily grant a passage to belligerent troops across his territory, and says that such an act may be at once made the cause of a declaration of war by the injured belligerent.§ Mr. Hall, speaking of the former custom that obtained in this respect, says: "There can be no question that existing opinion would imperatively forbid any renewed laxity of conduct in this respect on the part of neutral countries. Passage for the sole and obvious purpose of attack is clearly forbidden. The grant of permission is an act done by the State with the express object of furthering a warlike end, and is in its nature an interference in the war. It is therefore a non-neutral act; and the only excuse which can be accepted for its performance would be the impossible one that it is equally advantageous to, and desired by, both belligerents at once."||

Switzerland, in 1870, refused a passage to a body of Alsations

\* Hautefeuille, Vol. I, p. 337, comp. Sec. 3.

† Lawrence's Wheaton, p. 714.

§ Hautefeuille, Vol. I, p. 250.

‡ Vattel, p. 342.

|| Hall, p. 524.

enlisted for the French army, although they were without arms or uniforms; and Belgium refused to Prussia permission to transport the wounded by railway across her territory, on the ground that such permission would be of direct assistance to Prussia in the war by relieving from pressure her railway communications with the armies in France and enabling her to devote them to warlike uses exclusively.\*

The rule of exclusion of belligerent troops from the neutral territory does not apply to neutral waters. The constant practice of nations permits vessels of war of a belligerent, singly or in fleets, to traverse the territorial waters of a neutral; even when bound to attack an enemy it is not considered a violation of the neutral territory. The reason for this distinction is that nations do not usually guard the territorial waters in such manner as to at all times maintain complete control of them. The armed vessels of a belligerent are received into neutral ports, may seek asylum in them from threatened dangers, and may obtain in them needed assistance. The harmlessness of the passage across the territorial waters is complete; however numerous the fleet may be, it leaves no traces.†

5. The prize courts of the neutral must not be used to determine the validity of belligerent captures, and the present usage forbids the sale of prizes in neutral ports.

Prize courts must not be used by belligerents.

The neutrality proclamation of France, of May, 1861, contained the following clauses:

"1. No vessel of war or privateer of either of the belligerent parties will be allowed to enter or stay with prizes in our ports or roadsteads longer than twenty-four hours, except in a case of compulsory delay.

"2. No sale of goods belonging to prizes is allowed in our ports or roadsteads."‡

6. A neutral must not during a war acquire by purchase or otherwise any conquest made by either of the belligerents.§

Acquisition of territory by belligerents.

7. The neutral State must prohibit the enlistment of its citizens or subjects for the service of a belligerent.

Enlistments for belligerent service prohibited.

"The practice of neutrals to furnish troops to belligerents, or to allow them to enlist troops on neutral ground, was formerly common and allowed. This custom has now a lingering exist-

\* Hall, pp. 524-5.

† Hautefeuille, Vol. I, p. 314.

‡ Lawrence's Wheaton, p. 699, n.

§ Woolsey, Sec. 160.

ence; it is forbidden in some countries by law, and it is justly regarded as a violation of neutrality.”\*

“The principle that it is incumbent on the neutral sovereign to prohibit the levy of bodies of men within his dominions for the service of a belligerent, which was gradually growing authoritative during the eighteenth century, is now fully recognized as the foundation of a duty. And its application extends to isolated instances when the circumstances are such as to lead to serious harm being done to a friendly nation.

“On the other hand, a State is not expected to take precautions against the commission of microscopic injuries. At the outbreak of the American Civil War it was thought possible that large numbers of English subjects might engage in it, and an express prohibition of such service was therefore inserted in the proclamation. In that issued at the beginning of the war between France and Germany the prohibition was omitted, it not being likely that any sufficient number to justify government action would be found in the ranks of either army. As a matter of fact, a few English served as officers in both the German and French armies, without the neutrality of Great Britain being in any way supposed to be compromised.”†

In 1855 attempts were made by agents of the British government to enlist persons within the United States for the military service of that government in the Crimean War, under an Act of Parliament, “to permit foreigners to be enlisted and to serve as officers and soldiers of Her Majesty’s forces.” This being held as an attack on the sovereignty of the United States, as well as a violation of neutrality, the President demanded the recall of Mr. Crampton, the British Minister, and revoked the *exequaturs* of the British Consuls at New York, Philadelphia and Cincinnati for complicity in the attempts.

The opinion of the Attorney-General, Mr. Cushing, laid down the following principles as governing such cases:

Position of the  
United States.

No belligerent can rightfully make use of the territory of a neutral State for belligerent purposes without the consent of the neutral government.

The undertaking of a belligerent to enlist troops, on land or sea, in a neutral State, without the consent of the latter, is a hostile attack on its national sovereignty.

\* Woolsey, Sec. 161.

† Hall, p. 522.

A neutral State may permit belligerents to enlist troops within its territory, but, in that case, it must concede the same privilege to all. The United States refuse such liberty to all belligerents with impartial justice, and make this refusal known by a permanent Act of Congress.\*

All persons engaged in raising troops in the United States for a belligerent, whether citizens or foreigners, officers or individuals, except when protected by diplomatic privilege, may be indicted as malefactors under the statute.

Foreign consuls are not exempted, either by treaty or the law of nations, from the penal effect of the statute.

A foreign minister who engages in the enlistment of troops in the United States for his government is subject to be summarily expelled from the country, or after a demand for his recall, to be dismissed by the President.

The Act of Congress prohibiting foreign enlistments is a matter of municipal right, as to which foreign governments have no right to inquire, the international offence being independent of the existence of a prohibitory Act of Congress. All which it concerns such government to know is, whether such enlistments are permitted. It has no business to inquire whether there are statutes on the subject or not. Least of all has it a right to take notice of such statutes to see how they may be evaded.†

8. A neutral government must not permit the vessels of war of a belligerent to increase their armament or crews, or take on board arms or military stores in its ports, or make repairs to facilitate their cruising against an enemy. Under this rule coal is now refused to the vessels of war of a belligerent, except in such quantity as will enable them to reach one of the ports of their own country, or some nearer port.

Arming belligerent vessels.

An order of the British government, issued in January, 1862, with reference to the War of Secession in the United States, prohibited all vessels of war and privateers of either belligerent from using any port or roadstead in the British dominions as a station or place of resort for any warlike purpose, or for the purpose of obtaining any facilities of warlike equipment. No supplies, except provisions necessary for the crews, were to be

\* Comp. Sec. 3.

† Opinions of Attorneys-General U. S., Vol. VII, p. 367. Mr. Cushing, Aug. 9, 1855.



furnished such vessels. Coal could be furnished only in such quantity as would enable a vessel to reach the nearest port of her own country, or a nearer destination; and no coal could again be supplied to the same vessel in any British port within three months.\*

The United States adopted a similar regulation as to coal in 1870. A second supply of coal could not be furnished a vessel within three months, unless the vessel requesting it had in the meantime put into a European port.

"It is not for a moment to be denied that the actual law of nations places no restriction whatever upon the purchase of provisions by a belligerent in neutral ports; and that the limitation sometimes imposed of late years upon their supply, and upon that of coal, only indicates the direction in which usage is likely to grow. That it will remain in its present state is improbable. When vessels were at the mercy of the winds it was not possible to measure with accuracy the supplies which might be furnished to them, and as blockades were seldom continuously effective, and the nations which carried on distant naval operations were all provided with colonies, questions could hardly spring from the use of foreign possessions as a base of operations. Under the altered conditions of warfare, it cannot be admitted that the old rule is consistent with the principles of neutrality."†

Sec. 3. Treaty  
of Washing-  
ton, 1871.

The claims of the United States against Great Britain, growing out of the depredations on American commerce committed by the Alabama and other Confederate cruisers built in British ports, generally known as the "Alabama claims," were recognized by the treaty between those powers concluded in 1871, and they, with other matters in dispute, were submitted to arbitration at Geneva. It was agreed that the arbitrators appointed in accordance with the stipulations of the treaty should, in deciding all matters brought before them, be governed by certain rules defining the duties of a neutral government, and such principles of international law, not inconsistent with them, as the arbitrators should determine to be applicable to each case. The rules agreed upon are as follows:

"A neutral government is bound—

\* Lawrence's Wheaton, p. 717, n.

† Hall, p. 528. Comp. Sec. 6. Occasional Contraband, see "Contraband."

"First, to use due diligence to prevent the fitting out, arming, or equipping, within its jurisdiction, of any vessel which it has reasonable ground to believe is intended to cruise or to carry on war against a power with which it is at peace; and also to use like diligence to prevent the departure from its jurisdiction of any vessel intended to cruise or carry on war as above, such vessel having been specially adapted, in whole or in part, within such jurisdiction, to warlike use.

Rules to be observed by neutrals.

"Secondly, not to permit or suffer either belligerent to make use of its ports or waters as the base of naval operations against the other, or for the purpose of the renewal or augmentation of military supplies or arms, or the recruitment of men.

"Thirdly, to exercise due diligence in its own ports and waters, and, as to all persons within its jurisdiction, to prevent any violation of the foregoing obligations and duties."\*

The British government specially declared that the above rules were not accepted as a statement of principles of international law in force at the time the *Alabama* claims arose, but agreed that, in deciding upon those claims, the arbitrators should assume that the government of Great Britain had undertaken to act in accordance with them. It was further agreed that the rules laid down by the treaty should be observed in future by the contracting parties, and that other powers should be invited to accede to them.†

The arbitrators at Geneva, before proceeding to the discussion of the claims, laid down certain prefatory positions as in accordance with the three rules and recognized principles of international law, not inconsistent with them, as follows:

1. "The 'due diligence' referred to in the first and third of the said rules ought to be exercised by neutral governments in exact proportion to the risks to which either of the belligerents may be exposed from a failure to fulfill the obligations of neutrality on their part.

Rules of the Geneva arbitration.

3. "The effects of a violation of neutrality committed by means of the construction, equipment and armament of a vessel are not done away with by any commission which the government of the belligerent power benefited by the violation of neutrality may afterward have granted to that vessel; and the ultimate step by which the offence is completed cannot be

\* Treaties U. S., 1873, p. 415, "Great Britain."

† *Ibid.* p. 416.

admissible as a ground for the absolution of the offender ; nor can the consummation of his fraud become the means of establishing his innocence.

4. "The privilege of ex-territoriality accorded to vessels of war has been admitted into the law of nations, not as an absolute right, but solely as a proceeding founded on the principle of courtesy and mutual deference between different nations, and therefore can never be appealed to for the protection of acts done in violation of neutrality.

5. "The absence of a previous notice can not be regarded as a failure in any consideration required by the law of nations in those cases in which a vessel carries with it its own condemnation.

6. "In order to impart to any supplies of coal a character inconsistent with the second rule, prohibiting the use of neutral ports or waters as a base of naval operations for the belligerent, it is necessary that the said supplies should be connected with special circumstances of time, of persons, or of place, which may combine to give them such character."\*

The principles embodied in the three rules of the Treaty of Washington had long been held by the United States, they were the foundation of the neutrality acts passed by Congress in 1794 and 1818, and our government has been consistent in applying them to the acts of citizens and foreign residents of the United States. A late English writer says of the rules established by the treaty : "As the respective governments of the two countries are not agreed on the true meaning of this language, it is useless to speculate as to the effect which might be given to the provisions of the Treaty of Washington during any future war in which either Great Britain or the United States is a belligerent, the other of the two being neutral."†

The position of the United States is not open to question, and it can hardly be supposed that, in such case, Great Britain would fail to observe the rules as interpreted by the arbitrators at Geneva. Although no other governments have as yet given a formal assent to the principles stated in the rules, it may be safely assumed that they fix the law of nations on the subject of neutral duties as to vessels designed for the service of a belligerent.‡

\* Cushing's Treaty of Washington, p. 159.

† Hall, p. 536.

‡ For an account of the Neutrality Acts of the United States and trials under them, see Dana's Wheaton, p. 536 *et seq.*, n. 215.

The Act of Congress of June 5, 1794, was passed to render more effective the efforts of the government to maintain the position of exact neutrality it had previously declared with regard to belligerents in Europe. Its provisions, with those of subsequent acts, were codified in the Act of April 20, 1818, which repealed all previous laws on the subject. The provisions of the latter act are as follows :

Section 1 prohibits any citizen within the United States from accepting and exercising a commission to serve, in war, any foreign prince, State, colony, district, or people against any State, etc., with which the United States are at peace.

Neutrality laws  
of the United  
States.

Section 2 makes it criminal for any person within the United States to enlist on board any armed vessel of a foreign State, etc., whether public vessel or privateer ; or to procure any other person so to enlist ; or to go beyond the jurisdiction of the United States for the purpose of so enlisting—with an exception, permitting such enlistment on board a vessel of a subject of the State owning the vessel, where it was completely fitted and commissioned as a vessel of war before its arrival in the United States, and the person enlisting was only transiently within the United States.

Section 3 makes it criminal for any person within the United States to fit out or arm a vessel, or attempt or procure, or be concerned in fitting out or arming any vessel, with intent that it shall be employed in the service of any foreign State to commit hostilities against any State at peace with the United States, or to issue or deliver a commission to such a vessel with like intent. This section also forfeits the vessel, her stores and armament, and all materials procured for building and equipping her.

Section 4 relates to privateering by citizens against the commerce of the United States.

Section 5 makes it criminal for any person in the United States to increase or augment the force of any vessel of war or privateer of a foreign State, or to attempt or procure, or be concerned therein, said State being at war with a State at peace with the United States, by adding to or increasing the force of "any equipment solely applicable to war."

Section 6 makes it criminal for any person within the United States to begin or set on foot, or provide means for any military expedition or enterprise to be carried on from thence against any foreign State with which the United States are at peace.

Section 7 gives to the district courts jurisdiction of complaints for captures made within a marine league of the shores of the United States.

Section 8 authorizes the President to employ the land or naval forces or militia to prevent such enterprises or expeditions, and to take possession of or detain any vessel or her prizes, in order to execute the provisions of the act, or to make restitution if so adjudged.

Section 9 authorizes the President to employ the same forces to compel the departure of any vessel which, by the law of nations or treaties, ought not to remain within the United States.

Section 10 requires the owners or consignees of armed vessels about to sail from the United States, owned in whole or in part by citizens of the United States, to give security that the same shall not be employed by them in hostilities against any State at peace with the United States.

Section 11 authorizes revenue officers to detain any vessel, manifestly built for warlike purposes, whose cargo shall consist chiefly of munitions of war, when the circumstances render it probable that she is intended to be used in hostilities against any State with which the United States are at peace.\*

The punishments of fine and imprisonment in varying amounts may be inflicted on any person guilty of the offences named in the act, the maximum being a fine of three thousand dollars and imprisonment for three years.

Any minister of the United States, who is allowed the necessary jurisdiction by the government to which he is accredited, may issue all necessary writs to prevent citizens of the United States enlisting for service against a country at peace with the United States, and may call upon such force of the United States for this purpose as may be within his reach.†

Mr. Hall, reviewing the transactions which led to the passage of the Act of Congress of 1794, says: "The policy of the United States in 1793 constitutes an epoch in the development of the usages of neutrality. There can be no doubt that it was intended and believed to give effect to the obligations then incumbent upon neutrals. But it represented by far the most advanced existing

\* Rev. Statutes U. S., Sec. 5281, *et seq.* See "Piracy," Sec. 4.

† Rev. Stats. U. S., Sec. 4090.



opinions as to what those obligations were ; and in some points it even went further than authoritative international custom has up to the present time advanced. In the main, however, it is identical with the standard of conduct which is now adopted by the community of nations.”\*

The British “ Foreign Enlistment Act ” of 1870 contains substantially the same provisions for enforcing neutrality as the Act of Congress of 1818. The same penalties of fine and imprisonment are prescribed for the same offences. A vessel built for either of the belligerents under a contract made before the commencement of a war is not forfeited, but the builder must give security and take, or permit to be taken by the government, such steps as are necessary to prevent the vessel being removed during the continuance of the war. Prizes taken in violation of the neutrality of the government within its territorial jurisdiction, or by vessels fitted out contrary to the provisions of the act, if brought into any British port by the captor, his agent, or any one coming into possession of them with knowledge that they were so captured, may be seized, detained, and, on due proof, restored to the original owners.†

France has no law specially forbidding the building and equipment of vessels of war for the service of a belligerent, but under the Penal Code persons who by their acts expose the State to reprisals, or to a declaration of war, are liable to punishment ; and the government is left free to accommodate its rules for preserving neutrality to the existing law of nations. The neutrality proclamation of May, 1861, issued with reference to the War of Secession in the United States, prohibited all French citizens from assisting in the equipment or armament of vessels of war or privateers for either belligerent, and, under its provisions, several vessels built for the Confederates were seized and detained in French ports.‡

“ A comparison of international custom with the logical results of the unquestioned principles of neutrality seems then to lead to these conclusions :

“ 1. That an international usage prohibiting the construction and outfit of vessels of war, in the strict sense of the term, is in course of growth, but that, although it is adopted by the most important maritime powers, it is not yet old enough or quite

\* Hall, p. 515.

† Secs. 8-14.

‡ Hall, p. 536.

Sec. 4. Building vessels for a belligerent.

wide enough to have become compulsory on those nations which have not yet signified their voluntary adherence to it.

"2. That in the meantime a ship of war may be built and armed to the order of a belligerent, and delivered to him outside neutral territory ready to receive a fighting crew; or it may be delivered to him within such territory, and may issue as belligerent property, if it is neither commissioned nor so manned as to be able to commit immediate hostilities, and if there is not good reason to believe that an intention exists of making such use of the neutral territory as has been before indicated."\*

The writer of the above says, in a note on the same page: "In drawing these conclusions I find myself compelled to differ from the most recent writers," and he quotes from Heffter, Bluntschli, Calvo, and Ortolan expressions decidedly opposed to his views. He also seems to feel that some qualification is necessary, as he says further on this subject: "That the usage which is in course of growth extends the duties of a neutral State into new ground is plain; but it does not follow that the extension is either unhealthy or unnecessary. Though an armed ship does not differ in its nature from other articles merely contraband of war, it does differ from all in the degree in which it approaches to a completed means of attacking an enemy. The addition of a few trained men to its equipage, and of as much ammunition as can be carried in a small coasting vessel, adapts it for immediate use as part of an organized whole of which it is the most important element. The same cannot be said of any other article of contraband. It is neither to be expected nor wished that belligerent nations should be patient of the injury which would be inflicted upon them by the supply of armed vessels to their enemies as mere contraband of war."†

There is no doubt that should a neutral now persist in allowing such a course of trade on the part of its citizens, it would be regarded by the injured belligerent as a just cause of war. In the case of the two ironclad rams built at Liverpool in 1863, by the Messrs. Laird, professedly for a French commercial house, but in reality for the Confederates, Mr. Adams early addressed the British government on the subject, and during a correspondence of some months furnished proofs of the real destination of the vessels. The last letter of Mr. Adams to Lord

\* Hall, p. 537.

† *Ibid.* p. 539.

Russell on this subject, dated September 5th, 1863, pointed out fully the warlike character and power of the vessels, and stated that one of them was "on the point of departure from this kingdom on its hostile errand against the United States." He added: "It would be superfluous in me to point out to your lordship that *this is war*." "It was left to be understood that the sailing of the rams would be, not a probable cause of war, but war itself."\*

Mr. Dana says the intent of the neutral citizen in building or equipping vessels suitable for warlike purposes, during hostilities between foreign nations, is to be taken always as determining the question of violation of neutrality, and this is certainly the most reasonable view to take of this subject. He says: "The intent is all. The act is open to great suspicions and abuse, and the line may often be scarcely traceable; yet the principle is clear enough. Is the intent one to prepare an article of contraband merchandise, to be sent to the market of a belligerent, subject to the chances of capture and of the market? Or, on the other hand, is it to fit out a vessel which shall leave our port to cruise, immediately or ultimately, against the commerce of a friendly nation? The latter we are bound to prevent. The former the belligerent must prevent. In the former case the ship is merchandise, under *bonâ fide* neutral flag and papers, with a port of destination, subject to search and capture as contraband merchandise by the other belligerent, to the risks of blockade, and with no right to resist search and seizure, and liable to be treated as a pirate by any nation if she does any act of hostility to the property of a belligerent, as much as if she did it to that of a neutral. Such a trade in contraband a belligerent may cut off by cruising the seas and by blockading his enemy's ports. But to protect himself against vessels sailing out of a neutral port to commit hostilities, it would be necessary for him to hover off the ports of the neutral; and to do that effectually he must maintain a kind of blockade of the neutral coast, which, as neutrals will not permit, they ought not to give occasion for."†

The intent of the builders the test of illegality.

The violation of neutrality being made to consist of building and equipping vessels for a belligerent that are fit for warlike purposes exclusively, will often put the commerce of one of the

\* Dana's Wheaton, p. 573, n.

† *Ibid.* p. 563, n.

parties to a war at the mercy of fast steamers sent to sea ostensibly as merchant vessels, and armed as cruisers after leaving the neutral jurisdiction. The case of the Confederate steamer *Shenandoah*, sent to sea from London as the *Sea King*, and armed near the island of Madeira, shows this clearly ; but, in this case, the arbitrators at Geneva were unanimous in declaring that the British government was not "chargeable with any failure, down to that date, in the use of due diligence to fulfill the duties of neutrality." A majority of the arbitrators, however, held that Great Britain was responsible for the acts of that vessel subsequent to her departure from Melbourne on the 18th of February, 1865, she having enlisted men for service on board in that port.

It is said that the principle laid down by Mr. Dana would, if adopted generally, frequently bear hard upon the ship-building industry of neutrals, but this argument would seem to be of little force. The course of trade in ships is well established and known, and belligerents do not increase their merchant marine during war. Indeed, one of the claims frequently made by a belligerent is the right to prohibit the sale of purely mercantile vessels to neutrals by the other belligerent. Such a principle as holding the neutral responsible for the intended use of a vessel would simply prevent an increase in ship-building directly in the interest of one of the belligerents, a trade from which the neutral would, in any case, receive little benefit.\*

Mr. Dana, referring to the neutrality laws of the United States, says: "No cases have arisen as to the combination of materials which, separated, cannot do acts of hostility, but, united, constitute a hostile instrumentality ; for the intent covers all cases and furnishes the test. It must be immaterial where the combination is to take place, whether here or elsewhere, if the acts done in our territory—whether acts of building, fitting, arming, or of procuring materials for these acts—be done as part of a plan by which a vessel is to be sent out with intent that she shall be employed to cruise."†

"In the case of an expedition being organized in and starting from neutral ground, a violation of the neutrality may take place without the men of whom it is composed being armed at the moment of leaving.

\* Comp. Hall, p. 540. He argues strongly against Mr. Dana's position.

† Dana's *Wheaton*, p. 563, n. Comp. Sec. 7, "Contraband."

Sec. 5. Military expeditions from neutral territory.

"On the other hand, the uncombined elements of an expedition may leave a neutral State with one another, provided they are incapable of proximate combination into an organized whole. In 1870, during the Franco-German War, nearly 1200 Frenchmen embarked at New York in two French ships, the *Lafayette* and the *Ville de Paris*, for the purpose of joining the armies of their nation at home. They were not officered or in any way organized; but the vessels were laden with 96,000 rifles and 11,000,000 cartridges. Mr. Fish was of opinion that the ships could not be looked upon as intended to be used for hostile purposes against Germany, the men not being in an efficient state, and the arms and ammunition being in themselves subjects of legitimate commerce. There can be no doubt that the view taken by the government of the United States was correct. It was impossible for the men and arms to be so combined on board ship, or soon after their arrival in France, as to be capable of offensive use."\*

Trade with belligerents is carried on by neutrals, subject, of course, to the belligerent rights of visitation and search and blockade, and the neutral government is not called upon to take any measures to prevent trade in articles contraband of war even. Neutral governments, in warning their subjects against engaging in contraband trade, disclaim all responsibility connected with such trade, and withdraw the national protection from all persons violating the law of nations.†

Sec. 6. Trade with belligerents.

"It is to be observed that the rules concerning contraband relate to neutrals exporting such articles to a country at war. There is nothing unlawful when merchant vessels of either of the belligerents supply themselves in a neutral mart with articles having the quality of contraband. Here, again, the neutral is passive, and leaves the law of nations to be executed by others who would make all the property, if captured, prize of war."‡

The coasting trade of a country being generally considered exclusively national, cannot be engaged in by neutrals even when it is opened to them by a belligerent during war. Of course, where such trade is freely permitted to foreigners at all times, the fact of war will not of itself exclude the neutral from trade between belligerent ports: only the actual operations

Coasting trade of belligerents.

\* Hall, pp. 529-30.

† See Sec. 11, "Contraband."

‡ Woolsey, Sec. 178.



of war will have that effect. The prohibition rests on the fact that the coasting trade is regarded as of value to the belligerent, and the assistance afforded by neutrals conducting it, in case he is unable to do so, is a direct injury to the enemy.

“Rule of 1756.”

“During the war of 1756 the French government, finding the trade with their colonies almost entirely cut off by the maritime superiority of Great Britain, relaxed their monopoly of that trade, and allowed the Dutch, then neutral, to carry on the commerce between the mother-country and her colonies, under special licenses or passes granted for this particular purpose, excluding, at the same time, all other neutrals from the same trade. Many Dutch vessels so employed were captured by the British cruisers, and, together with their cargoes, were condemned by the prize courts, upon the principle that by such employment they were, in effect, incorporated into the French navigation, having adopted the commerce and character of the enemy, and identified themselves with his interests and purposes. They were, in the judgment of these courts, to be considered like transports in the enemy's service, and hence liable to capture and condemnation, upon the same principle with property condemned for carrying military persons or despatches. In these cases the property was considered, *pro hac vice*, as enemy's property, as so completely identified with his interests as to acquire a hostile character. So, where a neutral is engaged in a trade which is exclusively confined to the subjects of any country in peace and in war, and is interdicted to all others, and cannot at any time be avowedly carried on in the name of a foreigner, such a trade is considered so entirely national that it must follow the hostile situation of the country. There is all the difference between this principle and the more modern doctrine which interdicts to neutrals, during war, all trade not open to them in time of peace, that there is between the granting by the enemy of special licenses to the subjects of the opposite belligerent, protecting their property from capture in a particular trade which the policy of the enemy induces him to tolerate, and a general exemption of such trade from capture. The former is clearly cause of confiscation, whilst the latter has never been deemed to have such an effect. The ‘Rule of the War of 1756’ was originally founded upon the former principle: it was suffered to lie dormant during the War of the American

Revolution; and when revived at the commencement of the war against France in 1793, was applied, with various relaxations and modifications, to the prohibition of all neutral traffic with the colonies and upon the coasts of the enemy. The principle of the rule was frequently vindicated by Sir W. Scott in his masterly judgments in the High Court of Admiralty, and in the writings of other British public jurists of great learning and ability. But the conclusiveness of their reasonings was ably contested by different American statesmen, and failed to procure the acquiescence of neutral powers in this prohibition of their trade with the enemy's colonies. The question continued a fruitful source of contention between Great Britain and those powers, until they became her allies or enemies at the close of the war; but its practical importance will probably be hereafter much diminished by the revolution which has since taken place in the colonial system of Europe."\*

It is suggested that the questions connected with a neutral's engaging in the carrying trade of a belligerent have not lost their importance to so great an extent as has been supposed, taking into consideration the rule, now almost universally adopted, that the neutral flag covers the enemy's property not contraband of war. Should this rule be established as a principle of international law, it would be easy for a belligerent to carry on his foreign commerce with no risk of capture, by the employment of neutral vessels only in his trade.†

"A neutral nation preserves towards both the belligerents the several relations which nature has instituted between nations. She ought to show herself ready to render them every office of humanity reciprocally due from one nation to another; she ought, in everything not directly relating to war, to give them all the assistance in her power and of which they may stand in need. Such assistance, however, must be given with impartiality."‡

Sec. 7. Relations  
of neutrals with  
belligerents.

"The same spirit of humanity, as well as respect for a friendly power, imposes on neutrals the duty of opening their ports to armed vessels of both belligerents for purposes having no direct relation to the war, and equally likely to exist in time of peace. Cruisers may sail into neutral harbors for any of the purposes for which merchant vessels of either party frequent

\* Dana's Wheaton, p. 665.

† See Hall, p. 561.

‡ Vattel, p. 340.

the same places, except that merchant vessels are suffered to take military stores on board, which is forbidden generally, and ought to be forbidden, to ships of war.

"The general practice of nations, dictated perhaps by comity, has hitherto permitted cruisers to bring their prizes into neutral ports. This is not obligatory on neutrals, and sound policy demands that it be prohibited."\*

The present rule is for neutral nations to admit vessels of war with their prizes only in case of stress of weather, or for necessary supplies or repairs, and their stay in the neutral port is limited to twenty-four hours, unless a longer time is actually required.† The neutrality proclamation of Great Britain in 1870 prohibited the armed vessels of either party from carrying prizes into British waters, without any exceptions. The same proclamation limited the stay of vessels of war in British ports or waters to twenty-four hours, except in cases of necessity, which was to be determined by the authorities of the port.‡

Sec. 8. Asylum  
in neutral ter-  
ritory.

"Asylum is allowed within neutral territory and waters to a defeated or fugitive belligerent force, and the victor must stop his pursuit at the borders. The conditions, however, according to which refugees shall be received are not absolutely settled. In the case of troops fleeing across the borders, justice requires that they shall be protected, not as bodies of soldiers with arms in their hands, but as individual subjects of a friendly State; they are, we believe, in practice generally disarmed, and supported in their place of shelter at the expense of their sovereign. The other course would be unfriendly, as protected soldiers might issue forth from a friend's territory all ready for battle; and would also tend to convert the neutral soil into a theatre of war. In the case of ships of war running into neutral waters in order to escape from an enemy, to demand that they shall either be disarmed, like fugitive troops, or return to the high seas, seems to be a harsh measure and unauthorized by the usages of nations. . . . The analogy from the practice of disarming fugitive troops does not hold here. If the ship is driven out at once, it goes where a superior force is waiting for it; if it remains disarmed, the expense and inconvenience are great."§

\* Woolsey, Sec. 159.

† Comp. Sec. 2, also Sec. 6, "Privateering."

‡ Hall, App. IX, p. 716. The same rule was adopted by the United States.

§ Woolsey, Sec. 158.

Mr. Bernard says, in his "Historical Account of the Neutrality of Great Britain": "The rule that when hostile ships meet in a neutral harbor the local authority may prevent one from sailing simultaneously with or immediately after the other will not be found in all books on International Law. It is, however, a convenient and reasonable rule; it has gained, I think, sufficient foundation in usage; and the interval of twenty-four hours adopted during the last century in a few treaties and in some marine ordinances has been commonly accepted as a reasonable and convenient interval."\*

Twenty-four hours rule.

A neutral nation has the right to demand of belligerents that its sovereignty be respected and that no portion of its territory be used for any purposes of war. It claims from all belligerents the same protection for its citizens and their property, engaged in operations lawful during war, to which they are entitled in time of peace.

Sec. 9. Rights of neutrals.

"The rights of war can be exercised only within the territory of the belligerent powers, upon the high seas, or in a territory belonging to no one. Hence it follows that hostilities cannot lawfully be exercised within the territorial jurisdiction of the neutral State, which is the common friend of both parties."†

"The maritime territory of every State extends to the ports, bays, harbors, mouths of rivers, and adjacent parts of the sea enclosed by headlands, belonging to the same State. The general usage of nations superadds to this extent of territorial jurisdiction a distance of a marine league, or as far as a cannon-shot will reach from the shore, along all the coasts of the State. Within these limits its rights of property and territorial jurisdiction are absolute, and exclude those of every other nation."‡

"The maritime dominion stops at the place where continuous possession ceases, where the people who own the shore can no longer exercise power, at the point from whence they cannot exclude strangers, and finally, at the place where, the presence of foreigners being no longer dangerous to their safety, they no longer have an interest in excluding them. The point at which these three causes, which render the sea susceptible of private possession, cease is the same for all. It is the limit of the power which is represented by instruments of war. All the space through which projectiles pass, protected and defended by these

Maritime jurisdiction.

\* Page 273.

† Lawrence's Wheaton, p. 713.

‡ *Ibid.* p. 320.

warlike instruments, is territorial and subject to the dominion of the power that controls the shore. The greatest reach of a ball fired from a cannon on the land is, then, really the limit of the territorial waters. The sea-coast does not present one straight regular line, but is, on the contrary, almost always intersected by bays, capes, etc. If the maritime domain must always be measured from every point of the shore, great inconveniences would result. It has therefore been agreed in practice to draw an imaginary line from one promontory to another, and to take this line as the point of departure for the reach of the cannon. This mode, adopted by almost all nations, is only applicable to small bays, and not to gulfs of great extent, as the Gulf of Gascony, or the Gulf of Lyons, which are in reality parts of the open sea, and of which it is impossible to deny the complete assimilation with the great ocean.”\*

It has been suggested by Mr. Lawrence that, with the increased range of modern artillery, the territorial jurisdiction over the sea has been correspondingly increased. This would follow from Hautefeuille’s derivation of territoriality, but, as yet, the marine league is the extent of maritime jurisdiction that is claimed by nations.†

In consequence of reports reaching the government at Washington, in August, 1862, that the United States steamer *Adirondack* had chased a blockade-runner within the marine league of the island of New Providence in the Bahamas, the Secretary of State wrote to Mr. Welles, on August 14: “The President desires that you ascertain the truth of this fact with as little delay as possible, since, if it be true, the commander of the *Adirondack* has committed an inexcusable violation of the law of nations, for which acknowledgment and reparation ought to be promptly made. To guard against such occurrence hereafter, the President desires that you at once give notice to all commanders of American vessels of war that this government adheres to, recognizes, and insists upon the principle that the maritime jurisdiction of every nation covers a full marine league from the coast, and that acts of hostility or of authority within a marine league of any foreign country by any naval officer of the United States are strictly forbidden, and will bring upon such officer the displeasure of his government.”

\* Hautefeuille, Vol. I, p. 89.

† Note to Wheaton, p. 321.



"Not only are all captures made by the belligerent cruisers within the limits of this jurisdiction absolutely illegal and void, but captures made by armed vessels stationed in a bay or river, or in the mouth of a river, or in the harbor of a neutral State, for the purpose of exercising the rights of war from this station, are also invalid.

Sec. 20. Captures made in neutral territory.

"So, also, where a belligerent ship, lying within the neutral territory, made a capture with her boats out of the neutral territory, the capture was held to be invalid; for though the hostile force employed was applied to the captured vessel lying out of the territory, yet no such use of a neutral territory for the purposes of war is to be permitted. This prohibition is not extended to *remote* uses, such as procuring provisions and refreshments, which the law of nations universally tolerates; but no *proximate* acts of war are in any manner to be allowed to originate on neutral ground."\*

"If it be not admissible for an armed vessel of a belligerent to take advantage of neutral waters, in the manner mentioned in the text, as against enemy's vessels, it is, *à fortiori*, a violation of neutrality thus to use them, for the purpose of intercepting the merchant vessels of the same or of another neutral State, under suspicion of having contraband on board, or for any other purpose which might make them liable to the belligerent right of search."†

"There is no exception to the rule that every voluntary entrance into the neutral territory with hostile purposes is absolutely unlawful. 'When the fact is established,' says Sir W. Scott, 'it overrules every other consideration. The capture is done away; the property must be restored, notwithstanding that it may actually belong to the enemy.'

"Though it is the duty of the captor's country to make restitution of the property thus captured within the territorial jurisdiction of the neutral State, yet it is a technical rule of the prize courts to restore to the individual claimant, in such case, only on the application of the neutral government whose territory has thus been violated. This rule is founded upon the principle that the neutral State alone has been injured by the capture, and that the hostile claimant has no right to appear for the purpose of suggesting the invalidity of the capture.

\* Lawrence's Wheaton, pp. 715-16.

† *Ibid.* p. 716, n.

Duty of the neutral to restore illegal prizes.

"Where a capture of enemy's property is made within the neutral territory, or by armaments unlawfully fitted out within the same, it is the right as well as the duty of the neutral State, when the property thus taken comes into its possession, to restore it to the original owners. This restitution is generally made through the agency of the courts of admiralty and maritime jurisdiction.

"It has been judicially determined that the jurisdiction to inquire into the validity of captures made in violation of the neutral immunity will be exercised only for the purpose of restoring the specific property, when voluntarily brought within the territory, and does not extend to the infliction of vindictive damages, as in ordinary cases of maritime injuries. And it seems to be doubtful whether this jurisdiction will be exercised when the property has once been carried *infra præsidia* of the captor's country, and there regularly condemned in a competent court of prize. However this may be in cases where the property has come into the hands of a *bonâ fide* purchaser, without notice of the unlawfulness of the capture, it has been determined that the neutral Court of Admiralty will restore it to the original owner, where it is found in the hands of the captor himself, claiming under the sentence of condemnation. But the illegal equipment will not affect the validity of a capture made after the cruise to which the outfit has been applied is actually terminated."\*

Mr. Hall remarks on the above quotation from Wheaton: "Ortolan justly urges that as the sovereign rights of a nation cannot be touched by the decision of a foreign tribunal, the consequences of such a decision cannot be binding upon it; and it may be put still more generally that nothing performed *mero motu* by a wrong-doer in confirmation of his wrongful act can affect the rights of others."†

"If such a prize is brought into any of the neutral's ports, he is authorized to seize and restore it. If it be carried into a port of another country, he has a right to demand its restoration, and the prize court of the belligerent is bound to respect the objection. If the neutral fails to exercise his rights in these respects, the government of the vessel which has been thus captured may complain or even retaliate. The wrong-doing vessel may

\* Lawrence's Wheaton, pp. 721-5.

† Hall, p. 546.

afterwards have entrance into the waters of the injured neutral refused to it, since all admission of war vessels into neutral waters, unless required by treaty, depends on comity alone. Or its government, if the neutral prefer, or is forced to take that mode of redress, may be required to give satisfaction in regard to the injury.”\*

Treaties formerly guaranteed vessels from attack within neutral waters, and stipulated that all possible means should be used by the contracting parties to defend the vessels of a friendly nation if attacked within their territory. Many of the earlier treaties made by the United States contained such provisions, but they are no longer inserted in treaties, the well-established principles of international law giving sufficient guarantee of protection in all cases.†

Sec. 11. Immunity from attack in neutral waters.

The case of the American privateer General Armstrong, attacked and destroyed in 1814 by a British squadron while at anchor in the harbor of Fayal, is of interest from its final decision. Case of the General Armstrong.

The reclamations made by the United States against Portugal, founded on this case, were terminated by the treaty of February 26, 1851, which agreed that the claims should be submitted to arbitration. Louis Napoleon, then Prince President of the French Republic, was chosen as arbitrator. “There is some discrepancy between the American statement, to be deduced from the documents, and the summary of facts on which the award proceeds. The Prince President, in pronouncing that no indemnity was due from Portugal, does not deny the responsibility of a neutral to make compensation to a belligerent whose property has been captured or destroyed within his jurisdictional limits by the opposing belligerent; but he bases his decision on the assumed fact that the American commander had not applied, from the beginning, for the intervention of the neutral sovereign; that by having recourse to arms to repel an unjust aggression of which he pretended to be the object, he had himself failed to respect the neutrality of the territory of the foreign sovereign, and had thereby released that sovereign from the obligation in which he was to afford him protection by any other means than that of a pacific intervention; and that the Portuguese government could not be held responsible for

\* Woolsey, Sec. 163.

† U. S. Treaties, 1873, France, Prussia, etc.

the results of the collision which took place in contempt of its rights of sovereignty, and in violation of the neutrality of its territory, and without the local officers having been required, in proper time, and enabled to grant aid and protection to those having a right thereto.”\*

Case of the  
Florida.

In the case of the Confederate steamer Florida, captured by the Wachusett in the harbor of Bahia in 1864, the United States promptly accepted the responsibility of the illegal action committed by the commander of the Wachusett, and acceded to the demand of Brazil for reparation. The Florida was sunk by an accident while in the hands of the naval authorities of the United States, but explanations were made of the occurrence that were entirely satisfactory to Brazil, and the affair ended without any interruption of the friendly relations of the two governments.

Conduct to be  
observed by bel-  
ligerent vessels  
in neutral ports.

The conditions on which admission into neutral ports is conceded to the vessels of war of a belligerent are summed up by Negrin as follows :

“1. They must observe perfect harmony and peace, even towards their enemies in the same port.

“2. They must not enlist men to complete or increase their complements.

“3. Vessels of war or privateers must not increase the number or calibre of their guns.

“4. They must not use the neutral port as a post to maintain a surveillance over an enemy's vessels, or to obtain information as to their future movements.

“5. They must not quit the neutral port until twenty-four hours after the sailing of an enemy's fleet, vessel of war or merchant ship.

“6. No attempt must be made to take by stratagem or force an enemy's prizes that may be found in a neutral port.

“7. No sale of prizes must be made in a neutral port unless they have been previously condemned by a competent court.”†

Sec. 12, “Free  
ships, free  
goods.”

The question of the protection given to enemy's property at sea by a neutral flag, formerly so important in the discussion of international relations, has been practically settled by the Declaration of Paris, the second article of which is: “The neutral flag covers enemy's goods, with the exception of contra-

\* Lawrence's Wheaton, p. 720, n.

† Estudios sobre el Derecho Maritimo, p. 180.

band of war." Nearly all civilized nations, as we have seen, have formally acceded to the principles of the declaration, while those governments which declined to accept it as a whole have signified their adherence to the second article. It is to be noted, however, that the courts of the United States have uniformly declared the law of nations to authorize the capture of enemy's property in neutral ships, in spite of the consistent efforts of our government to reverse the rule.

"The United States and Great Britain have long stood committed to three points, as, in their opinion, established in the law of nations—(1) That a belligerent may take enemy's goods from neutral custody on the high seas; (2) That neutral goods are not subject to capture from the mere fact that they are on board an enemy's vessel; and (3) That the carrying of enemy's goods by a neutral is no offence, and, consequently, not only does not involve the neutral vessel in penalty, but entitles it to its freight from the captors, as a condition to a right to interfere with it on the high seas. While the government of the United States has endeavored to introduce the rule of 'free ships, free goods,' by conventions, her courts have always decided that it was not the rule of war; and her diplomatists and her text-writers—with singular concurrence, considering the opposite diplomatic policy of the country—have agreed to that position."\*

At the beginning of the War of Secession, Mr. Seward notified foreign governments that the United States would respect enemy's property in neutral ships. While such a notification would not be binding on the judiciary, practical effect could always be given to it by instructions from the executive department of the government to all commanders of vessels, and, until the principle is regularly established, this course would probably be taken by our government.

Neutrals have the right of free communication with belligerent governments, and for one belligerent to refuse ingress or egress to or from an enemy's country for such purposes would be considered an unfriendly act. But the belligerent may seize the ambassadors of the enemy sent to the neutrals, except within the neutral territory or on board neutral vessels.†

Sec. 13. The neutral's right of communication.

\* Dana's Wheaton, p. 606, *n*.

† Woolsey, Sec. 164, comp. Sec. 17, "Blockade."



## APPENDIX I.

### PAPERS CARRIED BY AMERICAN VESSELS.

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#### PAPERS DENOTING NATIONALITY :

- Register for vessels engaged in foreign trade.
- Enrollment for vessels engaged in coasting trade.
- License for vessels engaged in fisheries.

#### OTHER PAPERS that may be used to determine nationality :

- Shipping articles.
- Crew list.

#### OTHER PAPERS CARRIED :

- Passenger list.
- Manifest of cargo, foreign or coasting.
- Bills of lading.
- Ship's log-book.
- Charter-party, if chartered.
- Clearance.
- Bill of health.

The tonnage of the vessel must be engraved on the after beam of the main hatch.

The name of the vessel and port of ownership must be painted on the stern.

For pleasure yachts, leaving the United States, a special license is issued by the Treasury Department.

Register No.

Official No.  
Numerals. | Letters.

THE UNITED STATES OF AMERICA.  
CERTIFICATE OF REGISTRY.

	In pursuance of Chapter One, Title XLVIII, "Regulation of Commerce and Navigation," of the Revised Statutes of the United States, having taken and subscribed the _____ required by law, and having _____ that he, together with
[Seal.]	the only owner _____ of the Vessel called the _____ of _____, whereof _____ is at present Master, and as he hath _____ is a Citizen of the United States, and that the said Vessel was built at _____ in the year 18 _____, as appears by _____; and _____ having certified that the said Vessel has _____ deck _____ and mast _____, and that her length is _____ and tenths feet, her breadth _____ feet and tenths, her depth _____ feet and _____ tenths, her height _____ feet and _____ tenths; that she measures _____ tons and _____ hundredths, viz: _____ Tons. rooths.
Com. of Navigation.	Capacity under the Tonnage-Deck, Capacity between decks above the Tonnage-Deck, Capacity of inclosures on upper deck, viz. _____ Gross Tonnage, Deductions under Section 4153, Revised Statutes, as amended by Act of August 5, 1882, _____ *Net Tonnage, that the following described spaces, and no others, have been omitted, viz:
(Place for Naval Officer's Seal.)	and that she is a _____ has a _____ head and a _____ stern _____ and the said _____ having agreed to the description and admeasurement above specified, and sufficient security having been given according to law, said vessel has been duly registered at the Port of _____
Naval Officer.	Given under my hand and Seal at the Port of this _____ day of _____ in the year one thousand eight hundred and _____
(Place for Custom House Seal.)	_____ of Customs. * Total Tonnage not to be used.

No.

CERTIFICATE OF REGISTRY

Of the  
Called the  
Of

Issued at the

100 tons.

Port of  
District of

, 188 .

Date of Surrender :

, 188 .

Where Surrendered :

Cause of Surrender :

Port of

Amount of hospital money paid at the  
time of surrender of previous document :

\$

Period for which collection was made :

Total average number of officers and crew  
paid for :

Date when paid : , 188 .

of Customs.

Certificate No

Sec. 4319, Re

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United States

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Capacity of in

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INDORSEMENTS OF CHANGE OF MASTER.

District of , Port of

, 188 .  
having taken the oath required by law, is at present master of  
, late master.  
the within-named vessel, in lieu of

of Customs.

(Cat. No. 538.)

## CERTIFICATE OF ENROLLMENT

No.

of the

Called the

100 tons.

Issued at the

Port of

District of

, 188 .

of Customs.

Date of Surrender :

Where Surrendered :

Cause of Surrender :

Collector of Customs.

\* Insert her

† If more th  
owners, and the

‡ Here descr

§ Insert here

|| In every o

No.

## CERTIFICATE OF REGISTRY

Of the  
Called the  
Of

Issued at the

100 tons.

Port of  
District of

, 188 .

Date of Surrender :

, 188 .

Where Surrendered :

Cause of Surrender :

Port of

Amount of hospital money paid at the  
time of surrender of previous document :

\$

Period for which collection was made :

Total average number of officers and crew  
paid for :

Date when paid : , 188 .

of Customs.



Certificate No.

Official Number.  
Numerals. | Letters.

THE UNITED STATES OF AMERICA.

Sec. 4319, Rev. Stats.

Catalogue No. 538.

CERTIFICATE OF ENROLLMENT.

ENROLLMENT. In conformity to Title L, "Regulation of Vessels in Domestic Commerce," of the Revised Statutes of the United States, \*

having taken and subscribed the \_\_\_\_\_ required by law, and having \_\_\_\_\_ that he \_\_\_\_\_,

†

\_\_\_\_\_, citizen of the United States, and sole owner of the ship or vessel called the \_\_\_\_\_, of \_\_\_\_\_, whereof \_\_\_\_\_ is at present Master, and is a citizen of the United States, and that the said ship or vessel was built at \_\_\_\_\_, in the year 18\_\_\_\_, as appears by \_\_\_\_\_, and \_\_\_\_\_ having certified that the said ship or vessel has \_\_\_\_\_ deck and \_\_\_\_\_ mast, and that her length is \_\_\_\_\_ feet, her breadth \_\_\_\_\_ feet, her depth \_\_\_\_\_ feet, her height \_\_\_\_\_ feet, that she measures \_\_\_\_\_ tons, viz :

Tons.    100ths.

Capacity under tonnage deck,

Capacity between decks above tonnage deck,

Capacity of inclosures on the upper deck, viz :

Deductions under Section 4153, Revised Statutes, as amended by Act of August 5, 1882,

Gross Tonnage,

Net Tonnage,

that the following described spaces, and no others, have been omitted, viz :

and that she is a § \_\_\_\_\_, has a \_\_\_\_\_ head and a \_\_\_\_\_ stern, and § \_\_\_\_\_ sufficient security having been given, according to the said Title, the said ship or vessel has been duly enrolled at the port of \_\_\_\_\_

Given under my hand and seal at the Port of \_\_\_\_\_

in the District of \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, in the year one thousand eight hundred and eighty \_\_\_\_\_.

Naval Officer.

Collector of Customs.

\* Insert here the name of the person, with his occupation and place of abode, by whom the oath or affirmation is to be made.

† If more than one owner, insert the words "together with," and the name or names, occupation or occupations, place or places of abode of the owner or owners, and the part or proportion of vessel belonging to each owner.

‡ Here describe previous document.

§ Insert here the particular kind of vessel, whether ship, brigantine, snow, schooner, sloop, or whatever else.

|| In every original Enrollment insert the following: "the said \_\_\_\_\_ having agreed to the description and measurement above specified, and,"

INFORMANTS OF CHANGE OF MASTER.

District of \_\_\_\_\_, Port of \_\_\_\_\_,  
 \_\_\_\_\_, 188 \_\_\_\_  
 having taken the oath required by law, is at present master of  
 the within-named vessel, in lieu of \_\_\_\_\_,  
 \_\_\_\_\_, late master.  
 \_\_\_\_\_ of Customs.

(Cat. No. 538.)

CERTIFICATE OF ENROLLMENT

No. \_\_\_\_\_  
 of the \_\_\_\_\_  
 Called the \_\_\_\_\_  
 \_\_\_\_\_ tons.  
 Issued at the \_\_\_\_\_  
 Port of \_\_\_\_\_  
 District of \_\_\_\_\_,  
 \_\_\_\_\_, 188 \_\_\_\_  
 \_\_\_\_\_ of Customs.  
 Date of Surrender : \_\_\_\_\_  
 Where Surrendered : \_\_\_\_\_  
 Cause of Surrender : \_\_\_\_\_  
 Collector of Customs.

Port of \_\_\_\_\_  
 Amount of Hospital money paid at the  
 time of surrender of previous document :  
 \$ \_\_\_\_\_  
 Period for which collection was made : \_\_\_\_\_  
 Total average number of officers and crew  
 paid for : \_\_\_\_\_  
 Date when paid : \_\_\_\_\_, 188 \_\_\_\_

License No

Sec. 4321, 1

License

In purs

having give

shall not be  
defrauded ;  
than is here  
carrying on

INDORSEMENTS OF CHANGE OF MASTER.

District of , Port of , 188 .

having taken the oath required by law, is at present master of the within-named vessel, in lieu of , late master.

of Customs.

(Cat. No. 541.)

LICENSE FOR ENROLLED VESSEL.

License No.

of the

100 tons.

Issued at the Port of

District of

\* Insert "

† Insert t

‡ Insert r

§ " Sworn

, 188 .

Date of Surrender :

Where Surrendered :

Cause of Surrender :

Collector of Customs.

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Port of

Amount of Hospital money paid at the  
time of surrender of previous document:

\$

Period for which collection was made :

Total average number of officers and crew  
paid for :

Date when paid : , 188

License No.

Official Number.  
Numerals. | Letters.

Sec. 4321, Rev. Stats.

Cat. No. 541.

THE UNITED STATES OF AMERICA.

LICENSE FOR ENROLLED VESSEL.

License for carrying on the \*

In pursuance of Title L, "Regulation of Vessels in Domestic Commerce," of the Revised Statutes of the United States,†

having given bond that the \_\_\_\_\_ called the \_\_\_\_\_, whereof the said \_\_\_\_\_ is Master, burden-  
\_\_\_\_\_ tons and \_\_\_\_\_ hundredths, as appears by her enrollment, \_\_\_\_\_, dated at ‡

shall not be employed in any trade, while this License shall continue in force, whereby the revenue of the United States shall be  
defrauded; and having also § \_\_\_\_\_ that this License shall not be used for any other vessel, or for any other employment  
than is herein specified, License is hereby granted for the said \_\_\_\_\_ called the \_\_\_\_\_ to be employed in  
carrying on the \* \_\_\_\_\_ for one year from the date hereof, and no longer.

Given under my hand and seal at the Port of \_\_\_\_\_ in the  
\_\_\_\_\_ District of \_\_\_\_\_, this \_\_\_\_\_ day of  
\_\_\_\_\_, in the year one thousand eight hundred and  
\_\_\_\_\_ eighty

Naval Officer.

Collector of Customs.

\* Insert "Coasting-Trade," "Whale-fishery," "Mackerel-fishery," or "Cod-fishery," as the case may be.

† Insert the name of the husband or managing owner, with his occupation and place of abode, and the name of the master, with the place of his abode.

‡ Insert name of District, day, month and year, in words at length.

§ "Sworn" or "affirmed," as the case may be.



INDORSEMENTS OF CHANGE OF MASTER.

District of \_\_\_\_\_, Port of \_\_\_\_\_,  
 \_\_\_\_\_, 188\_\_\_\_,  
 having taken the oath required by law, is at present master of  
 the within-named vessel, in lieu of \_\_\_\_\_, late master.  
 \_\_\_\_\_ of Customs.

(Cat. No. 541.)

LICENSE FOR ENROLLED VESSEL.		Port of _____
License No. _____	of the _____	Amount of Hospital money paid at the time of surrender of previous document: \$ _____
_____ TONS.		Period for which collection was made : _____
Issued at the Port of _____		Total average number of officers and crew paid for : _____
District of _____		Date when paid : _____ 188____.
_____ , 188____.		
Date of Surrender : _____		
Where Surrendered : _____		
Cause of Surrender : _____		
Collector of Customs.		

Former License No.

, dated at

, 18

License N

Sec. 4321,

To carry c

In pur

†  
having giv

continue in

License sh

for the sai

the date h

INDORSEMENTS OF CHANGE OF MASTER.

District of, , Port of

, 188 .  
having taken the oath required by law, is at present master of  
the within-named vessel, in lieu of  
late master.

of Customs.

(Cat. No. 542.)

LICENSE OF VESSEL UNDER TWENTY  
TONS.

License No

of the

100 tons.

Issued at the Port of

District of

Port of  
Amount  
time  
\$  
Period

Total  
paid  
Date w

\* Insert

† Insert

, 18

Admeasured at the Port of

, 18 .  
, 18 .

When built :

Where built :

Where surrendered :

Date of surrender :

Cause of surrender :

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Amount of Hospital money paid at the  
time of surrender of previous document:

\$  
Period for which collection was made :

al average number of officers and crew  
paid for :

Period when paid :

188 .

License No.

Official Number.  
Numerals. | Letters.

THE UNITED STATES OF AMERICA.

Sec. 4321, Rev. Stats.

Cat. No. 542.

LICENSE OF VESSEL UNDER TWENTY TONS

To carry on the \*

for one year.

District of

, Port of

In pursuance of Title L, " Regulation of Vessels in Domestic Commerce," of the Revised Statutes of the United States,

having given bond that the

called the

, whereof the said

is Master, burden

tons

hundredths, length

feet, breadth

feet, depth

feet, proof being had of her admeasurement, shall not be employed in any trade while this license shall

continue in force whereby the revenue of the United States shall be defrauded, and having also

that this

License shall not be used for any other vessel, or for any other employment than is herein specified: License is hereby granted

for the said

, called the

, to be employed in carrying on the

for one year from

the date hereof, and no longer.

Given under my hand and seal, at the Port of

in

the District of

, this

day of

, in the year one thousand eight hundred and

eighty

Naval Officer.

of Customs.

\* Insert "Coasting-trade," "Whale-fishery," "Mackerel-fishery," or "Cod-fishery," as the case may be.

† Insert the name of the husband or managing owner, with his occupation and place of abode, and the name of the master, with the place of his abode.

INDORSEMENTS OF CHANGE OF MASTER.

District of, , Port of , 188 .  
 having taken the oath required by law, is at present master of  
 the within-named vessel, in lieu of late master.  
 of Customs.

(Cat. No. 542.)

LICENSE OF VESSEL UNDER TWENTY TONS.		Port of
License No	of the	Amount of Hospital money paid at the time of surrender of previous document: \$
ISS tons.		Period for which collection was made :
Issued at the Port of		Total average number of officers and crew paid for :
District of		Date when paid : , 188 .
	, 18	
Admeasured at the Port of		
	, 18 .	
When built :	, 18 .	
Where built :		
Where surrendered :		
Date of surrender :		
Cause of surrender :		



# G ARTICLES.

OR Revised Statutes makes it obligatory on the part of the master of a copy of the agreement (omitting signatures) to be placed or crew, under a penalty not exceeding One Hundred Dollars. The 26, 1884, prohibits the payment of advance wages to seamen of the same law requires that vessels shall be provided with ce to seamen, are annexed in full.

JARVIS PATTEN,  
Commissioner of Navigation.

any seaman wages before leaving the port at which such seaman may be engaged advance wages to any other person, or to pay any person, other than an officer tion for the shipment of seamen. Any person paying such advance wages or such in, shall be punished by a fine not less than four times the amount of the wages so not exceeding six months, at the discretion of the court. The payment of such absolve the vessel, or the master or owner thereof, from full payment of wages libel, suit, or action for the recovery of such wages: *Provided*, that this section be lawful for any seaman to stipulate in his shipping agreement for an allotment er relative, but to no other person or corporation. And any person who shall lotted shall, for every such offense, be punishable by a fine of not exceeding five in of the court. This section shall apply as well to foreign vessels as to vessels of agent of which has violated this section or induced or connived at its violation,

## ES MUST HAVE SLOP-CHEST, &C.

xy-nine of the Revised Statutes shall also be provided with a slop-chest, which aman employed, including boots or shoes, hats or caps, under clothing and outer ; also a full supply of tobacco and blankets. Any of the contents of the slop-chest for his own use, at a profit not exceeding ten per centum of the reasonable whole- f any such vessel is not provided, before sailing, as herein required, the owner isions of this section shall not apply to vessels plying between the United States hama Islands, the West Indies, Mexico and Central America.

## TES OF AMERICA.

amen in the Merchant Service of the United States.

LIII, Revised Statutes of the United States.

U. S. Shipping Commissioner for the Port of , 18 .  
of the of which is at present Master,

mission of the Master. No sheath knives or grog allowed, and t on board by the crew.

le voyage in addition to the  
ny case required by law.

## SUBSTITUTES.

na, z.	Coffee, Sugar, oz.	Water, qts.
1/8	1/2	2
1/4	1/2	2
1/2	1/2	2
3/4	1/2	2
1	1/2	2
1 1/4	1/2	2
1 1/2	1/2	2
1 3/4	1/2	2
2	1/2	2

One ounce of coffee or cocoa or chocolate may be substituted for one-quarter ounce of tea; mol- lasses for sugar, the quantity to be one-half more; one pound of potatoes or yams; one-half pound flour or rice; one-third pint of peas or one-quarter pint of barley may be substituted for each other.

When fresh meat is issued, the proportion to be two pounds per man, per day, in lieu of salt meat.

Flour, rice and peas, beef and pork may be substituted for each other, and for potatoes, onions may be substituted.

nest and sober manner, and to be at all times diligent in their respective duties, son who shall lawfully succeed him, and of their superior officers, in everything n boats, or on shore, and in consideration of which service to be duly performed gainst their names respectively expressed, and to supply them with provisions ment or willful or negligent destruction of any part of the vessel's cargo or stores : same; And if any person enters himself as qualified for a duty which he portion to his incompetency. And it is also agreed that if any member of the therwise, he shall represent the same to the master or officer in charge of the the case may require.

hess whereof the said parties have subscribed their names on the her side or sides hereof on the days against their respective signatures mentioned.

by Master, on the day of , 188 .

le Columns to be filled up at the end of the Voyage.

which minated.	Date of Delivery of Lists to Shipping Commissioner.	I hereby declare to the truth of the entries in this Agreement and account of crew.

hip is to touch, or, if that cannot be done, the general nature and probable length s to terminate.

and which are not contrary to law.

f it, and none may be added or substituted. Care should be taken at the time of during the voyage than the number for whom signatures are provided in this

unless attested by a Shipping Commissioner, Consul or Vice-Consul, to be made

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at of Hospital money paid at the  
of surrender of previous document:

for which collection was made :

average number of officers and crew  
for :

when paid : , 188 .

## SHIPPING ARTICLES.

Notice is hereby given that Section 4519 of the U. S. Revised Statutes makes it obligatory on the part of the master of a merchant vessel of the United States to cause a legible copy of the agreement (omitting signatures) to be placed pasted up in such part of the ship as to be accessible to the crew, under a penalty not exceeding One Hundred Dollars.

Notice is also given that Section 10 of the Act of June 26, 1884, prohibits the payment of advance wages to seamen shipping in ports of the United States, and that Section 11 of the same law requires that vessels shall be provided with slop-chests. These two sections, being of special importance to seamen, are annexed in full.

JARVIS PATTEN,

[illegible]

VESSELS OF UNITED STATES MUST HAVE SLOP-CHEST, &c.

Sac. 11. That every vessel mentioned in section forty-five hundred and sixty-one of the Revised Statutes shall also be provided with a slop-chest, which shall contain a complement of clothing for the intended voyage for each seaman employed, including boots or shoes, hats or caps, under clothing and outer clothing, oiled clothing, and everything necessary for the wear of a seaman; and also a full supply of tobacco and blankets. Any of the contents of the slop-chest shall be sold, from time to time, to any or every seaman applying therefor, for his own use, at a profit not exceeding ten per centum of the reasonable whole-sale value of the same at the port at which the voyage commenced. And every vessel so provided with a slop-chest, before calling, as herein required, the owners of the same shall deposit with the collector of the port at which the vessel is to call, a bond, in the penalty of five hundred dollars, to be forfeited in case the vessel and the provisions thereon shall not comply with the provisions of the Act, and the Dominion of Canada, Newfoundland, the Bermuda Islands, the Bahamas Islands, The Wind Indies, Mexico and Central America.

## UNITED STATES OF AMERICA.

Articles of Agreement between Master and Seamen in the Merchant Service of the United States.

Required by Act of Congress, Title VIII, Revised Statutes of the United States.

U. S. Shipping Commissioner for the Port of . 18

It is agreed between the Master and Seamen, or mariners, of the \_\_\_\_\_ of which \_\_\_\_\_ is at present Master.

or whoever shall go for Master, now bound from the Port of<sup>1</sup> to

Going on shore in foreign ports is prohibited, except by permission of the Master. No sheath knives or grog allowed, and none to be brought on board by the crew.

Scale of Provisions to be allowed and served out to the Crew during the voyage in addition to the daily issue of lime and lemon juice and sugar, or other antiscorbutics in any case required by law.

### SUBSTITUTES.

	Bread, lb.	Beef, lb.	Pork, lb.	Flour, lb.	Peas, pint.	Rice, pint.	Barley, pint.	Tea, oz.	Coffee, oz.	Sugar, oz.	Water, qts.
Sunday .....	1	½		½				½	½	2	3
Monday .....	1		½		½			½	½	2	3
Tuesday .....	1	½		½				½	½	2	3
Wednesday .....	1	½		½				½	½	2	3
Thursday .....	1		½		½			½	½	2	3
Friday .....	1		½		½			½	½	2	3
Saturday .....	1	½						½	½	2	3

One ounce of coffee or cocoa or chocolate may be substituted for one-quarter ounce of tea; molasses for sugar; the quantity to be one-half more of one pound of potatoes or yams; one-half pound of flour or rice; one-third pint of peas or one-quarter pint of barley may be substituted for each.

When fresh meat is issued, the proportion to be two pounds per man, per day, in lieu of salt meat.

Flour, rice and peas, beef and pork may be substituted for each other, and for potatoes; onions may be substituted.

And the said crew agree to conduct themselves in an orderly, faithful, honest and sober manner, and to be at all times diligent in their respective duties, and to be obedient to the lawful commands of the said master, or of any person who shall lawfully succeed him, and of their superior officers, in everything relating to the vessel, and the stores and cargo thereof, whether on board, in boats, or on shore, and in consideration of which service to be duly performed the said master hereby agrees to pay to the said crew, as wages, the sums against their names respectively expressed, and to supply them with provisions according to the annexed scale. And it is hereby agreed that any embezzlement or willful or negligent destruction of any part of the vessel's cargo or stores shall be made good to the owner out of the wages of the person guilty of the same: *And if any person enters himself as qualified for a duty which he is not qualified to perform, and thereby causes damage to the vessel or cargo, or otherwise, he shall be held responsible therefor.* And it is also agreed that if any member of the crew consider himself to be aggrieved by any breach of the agreement or otherwise, he shall represent the same to the master or officer in charge of the ship in a quiet and orderly manner, who shall thereupon take such steps as the case may require.

It is also agreed that<sup>2</sup>

The authority of the Owner or Agent for the allotments mentioned within is in my possession.

In witness whereof the said parties have subscribed their names on the  
other side or sides hereof on the days against their respective  
signatures mentioned.

This is to be signed if such an authority has been produced,  
and to be scored across in ink if it has not.

Signed by \_\_\_\_\_ Master, on the \_\_\_\_\_ day of \_\_\_\_\_, 188\_\_\_\_.

These Columns to be filled up at the end of the Voyage.

Date of Commencement of Voyage.	Port at which Voyage Commenced.	Date of Termination of Voyage.	Port at which Voyage Terminated.	Date of Delivery of Lists to Shipping Commissioner.	I hereby declare to the truth of the entries in this Agreement and account of crew.
					Master.

Here the voyage is to be described, and the places named at which the ship is to touch, or, if that cannot be done, the general nature and probable length of the voyage is to be stated, and the port or country at which the voyage is to terminate.

<sup>2</sup> Here any other stipulations may be inserted to which the parties agree, and which are not contrary to law.

Any erasure, interlineation or alteration in this agreement will be void, unless attested by a Shipping Commissioner, Consul or Vice-Consul, to be made with the consent of the persons interested.

Time of Entry.	Time at which to be on Board.	In what Capacity.	Shipping Commis- sioner's Signature or Initials.	Allotment Payable to	Conduct and Qualification.
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**Secs. 4573, 4574 and 4575, }  
Revised Statutes. }**

CREW LIST.

List of Persons composing the Crew of the  
is Master, bound for

of

, whereof

Names.	Places of Birth.	Places of Residence	Of What Country Citizens or Subjects.	Age.	Description of their Persons.				
					Height. Feet. Ins.	Complexion.	Hair.	Eyes.	



I, \_\_\_\_\_, Master of the said \_\_\_\_\_, do solemnly, sincerely,  
and truly \_\_\_\_\_ that the within List contains the names of all the Crew  
of the said \_\_\_\_\_, together with the places of their birth and residence,  
as far as I can ascertain the same.

Master.

\_\_\_\_\_ Port of \_\_\_\_\_  
and subscribed this \_\_\_\_\_ day of \_\_\_\_\_,  
188 \_\_\_\_\_, before me.

Collector.

General Customs Regulations of 1874, }  
Art. 187. }

I do certify that the within is a true copy of the List of the Crew of the  
\_\_\_\_\_ of \_\_\_\_\_, whereof \_\_\_\_\_ is Master, taken from  
the original on file in this office.

Given under my hand and seal of \_\_\_\_\_ office, at the Custom  
House, this \_\_\_\_\_ day of \_\_\_\_\_  
in the year of our Lord one thousand eight hundred  
and eighty \_\_\_\_\_

Collector.

(Cat. No. 477.)

---

CREW LIST  
of \_\_\_\_\_

Master.

Dated :  
Custom-House, Port of \_\_\_\_\_

, 188 \_\_\_\_\_.

List or Manifest of all the Passengers taken on board the \_\_\_\_\_ whereof  
 is Master, from \_\_\_\_\_ ; burden \_\_\_\_\_ tons.

Name.	Age. Years. Months.	Sex.	Occupation.	The Country to which they severally belong.	The Country of which they intend to become inhabitants.	Who Died on the Voyage.
-------	------------------------	------	-------------	---	---	----------------------------

I, \_\_\_\_\_, Master of the above-named \_\_\_\_\_, from the Port of \_\_\_\_\_, do solemnly, sincerely, and truly swear that the above List contains the names and descriptions of all the Passengers who were on board the said \_\_\_\_\_ at the time of or since her last departure from the said Port of \_\_\_\_\_, or that have been taken on board the said vessel at any foreign port or place, and that *none* have died on the voyage.

Collector's Office, Port of \_\_\_\_\_, 188 . Subscribed and sworn to before

Collector.

Port of

, 188 .

LIST OF PASSENGERS

Taken on board the

From

Master,

(Master's or Conductor's Oath on Clearing Outward.)

DISTRICT AND PORT OF

I, \_\_\_\_\_, Master or Conductor of the \_\_\_\_\_, bound from  
the port of \_\_\_\_\_ to \_\_\_\_\_, do solemnly, sincerely and truly  
swear that the Manifest of the Cargo, on board the said \_\_\_\_\_ now  
delivered by me to the Collector of this District, and subscribed with my name,  
contains, according to the best of my knowledge and belief, a full, just and true  
account of all the Goods, Wares and Merchandise now actually laden on board  
the said vessel or vehicle, and of the value thereof; and if any other Goods,  
Wares or Merchandise shall be laden or put on board the said  
previous to her departure from this port, I will immediately report the same to  
the Collector. I do also swear that I verily believe the duties on all Foreign  
Merchandise therein specified have been paid or secured according to law and  
that no part thereof is intended to be relanded within the United States; and that  
if by distress, or other unavoidable accident, it shall become necessary to reland  
the same, I will forthwith make a just and true report thereof to the Collector of  
the Customs of the District wherein such distress or accident may happen. And

Port of

, 188 .

LIST OF PASSENGERS

Taken on board the

Master,

From





(Master's or Conductor's Oath on Clearing Outward.)

DISTRICT AND PORT OF

I, \_\_\_\_\_, Master or Conductor of the \_\_\_\_\_, bound from the port of \_\_\_\_\_ to \_\_\_\_\_, do solemnly, sincerely and truly swear that the Manifest of the Cargo, on board the said \_\_\_\_\_ now delivered by me to the Collector of this District, and subscribed with my name, contains, according to the best of my knowledge and belief, a full, just and true account of all the Goods, Wares and Merchandise now actually laden on board the said vessel or vehicle, and of the value thereof; and if any other Goods, Wares or Merchandise shall be laden or put on board the said \_\_\_\_\_ previous to her departure from this port, I will immediately report the same to the Collector. I do also swear that I verily believe the duties on all Foreign Merchandise therein specified have been paid or secured according to law and that no part thereof is intended to be relanded within the United States; and that if by distress, or other unavoidable accident, it shall become necessary to reland the same, I will forthwith make a just and true report thereof to the Collector of Customs of the Districts wherein such distress or accident may happen. And said Cargo is truly intended to be landed in the Port of \_\_\_\_\_

So help me God.

Master.

Sworn to before me this \_\_\_\_\_ day  
of \_\_\_\_\_, 188 .

Deputy Collector of Customs.

OUTWARD FOREIGN MANIFEST

Of

For

I, \_\_\_\_\_, Master (or Commander) of the \_\_\_\_\_  
of \_\_\_\_\_ do swear (or affirm) to the  
truth of this Manifest, and that to my best knowledge and belief all the Goods,  
Wares and Merchandise of foreign growth or manufacture therein contained were  
legally imported, and the duties thereupon have been paid or secured according  
to law.

Sworn to before me, this  
day of 1884.

Deputy Collector.

Port of . . . } 188

Master of the  
of  
sworn, as the law directs, to the within Manifest, consisting of  
articles of entry, and delivered a duplicate thereof, permission is hereby granted  
to the said to proceed to the Port of  
State of  
in the  
having

CUSTOMS OF THE DISTRICTS WHEREIN SUCH BUSINESS OF ACCIDENT MAY HAPPEN, AND

said Cargo is truly intended to be landed in the Port of

So help me God.

Master.

day

Sworn to before me this

of , 188 .

Deputy Collector of Customs.

## OUTWARD FOREIGN MANIFEST

Of

For

188 .

## COASTING MANIFEST.

Manifest of the whole Cargo on board the for	whereof 1884.	is Master, burden	tons, bound from				
Marks.	Numbers.	Number of Entry.	Packages and Contents.	Shippers.	Residence.	Consignees.	Residence.

I, \_\_\_\_\_, Master (or Commander) of the \_\_\_\_\_ called  
the \_\_\_\_\_ of \_\_\_\_\_ do swear (or affirm) to the  
truth of this Manifest, and that to my best knowledge and belief all the Goods,  
Wares and Merchandise of foreign growth or manufacture therein contained were  
legally imported, and the duties thereupon have been paid or secured according  
to law.

Sworn to before me, this \_\_\_\_\_ }  
day of \_\_\_\_\_ 1884. }

Deputy Collector.

Port of \_\_\_\_\_ }  
District of \_\_\_\_\_, 188 }  
Master of the \_\_\_\_\_ of \_\_\_\_\_ having  
sworn, as the law directs, to the within Manifest, consisting of  
articles of entry, and delivered a duplicate thereof, permission is hereby granted  
to the said \_\_\_\_\_ to proceed to the Port of \_\_\_\_\_ in the  
State of \_\_\_\_\_

Given under my hand, at \_\_\_\_\_, the day and year above mentioned.

Deputy Collector.

Deputy Naval Officer.

District and Port of \_\_\_\_\_

# OATH OF MASTER TO MANIFEST ON ENTERING COASTWISE.

I, \_\_\_\_\_, Master of the vessel called the \_\_\_\_\_, of  
\_\_\_\_\_, do swear that the \_\_\_\_\_ manifest which I now exhibit contains  
a true account of the articles composing the whole cargo of the said \_\_\_\_\_,  
which now are or at any time have been on board the said \_\_\_\_\_,  
from the time of her departure from the port of \_\_\_\_\_ from whence  
she first sailed, excepting \_\_\_\_\_  
and that no part thereof has been landed therefrom excepting \_\_\_\_\_

Port of \_\_\_\_\_

Sworn and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_ 1884.  
Collector.



THE UNITED STATES OF AMERICA.  
CLEARANCE OF VESSEL TO A FOREIGN PORT.

District of  
Port of

THESE ARE TO CERTIFY, ALL WHOM IT DOTH CONCERN,

That , Master or Commander of the , burden  
Tons, or thereabouts, mounted with Guns,  
navigated with Men, built and bound for  
, having on board

hath here entered and cleared his said vessel, according to law.

Given under our hands and seals, at the Custom  
House of , this  
day of , one thousand eight  
hundred and eighty , and in  
the year of the Independence  
of the United States of America.

Collector,

Naval Officer.

Section 4207, Revised Statutes of the United States.

# CONSULAR FEES.

(Under Regulations and Circulars of the Department of State.)

To February 1, 1883.

## *Acknowledgments.*

1. Of the master to bottomry bond, with certificate under seal.....	\$1 00
2. Of the master to a mortgage or mortgage bill of sale of vessel.....	1 00
3. Of the master to an order for payment of seamen's wages at home, including making up the order if required.....	1 00
4. Of assignment of bottomry bond.....	1 00
5. Of the vendor to a bill of sale of vessel.....	1 00
6. Of power of attorney to transfer United States stock.....	No fee.

## *Authenticating Copies of Papers.\**

7. Of advertisement for funds on bottomry.....	\$1 00
8. Of inventories and letters, or either, of master.....	1 00
9. Of marine note of protest.....	1 00
10. Of extended protest.....	1 00
11. Of account of sales of vessels, cargo, provisions and stores, or either.....	1 00
12. Of call, warrant, and report of survey on vessel, hatches, cargo, provisions, and stores, or either.....	1 00

## *Authenticating Signatures.†*

13. To average bonds.....	\$1 00
14. To estimate of repairs of vessels.....	1 00
15. To (auctioneer's) account of sales of vessel or cargo, provisions, or stores.....	1 00
16. To reports of survey on vessel or cargo, provisions, or stores.....	1 00
17. Of forms of application for arrears of pay of bounty of deceased or disabled soldiers.....	25
18. For authenticating all the vouchers and other papers necessary for drawing a pension.....	50

## *Certificates.*

19. To bill of health.....	\$2 50
20. To indorsement of bottomry on ship's register.....	1 00
21. To ditto on payment of bottomry on ship's register.....	1 00
22. To ditto of new ownership on ship's register.....	1 00
23. To cancelling ship's register.....	1 00
24. To value of foreign currency in triplicate.....	1 00
25. Debenture certificate, including oaths of master and mate, and the complete execution of the certificate‡.....	2 50
26. For medical examination of persons on vessels bound from foreign ports to ports in the United States:	
For twelve persons and under.....	1 50
For over twelve and not over twenty persons....	2 50
From twenty to one hundred, for each ten persons or less...	1 00
Over one hundred, at the rate of \$5 for each additional hundred persons.	
27. To decision and award, in cases of protest against masters, passengers or crew.....	5 00
28. To the deposit of a ship's register and papers when required by custom-house authorities....	1 00
29. In cases of vessels deviating from the voyage.....	1 00
30. To invoice of breeding-animals.....	2 50
31. To invoice of works of art, the production of American artists.....	2 50
32. To manifest of fish, oil, bone, &c.....	2 50
33. To a vessel's manifest.....	2 50
34. To the purchase of foreign-built or American vessel abroad.....	2 50
35. To the examination required by section 2162 of the Revised Statutes, for each emigrant (Art. XXI).....	25

\*The fee for the "copies" is not an official fee to be accounted for. The fee for authentication is an official fee.

†When it is possible to embrace several signatures in one certificate, the Consul will do so, and but one fee will be charged for such certificate.

‡Except by consular officers of the United States at ports on the Rio Grande, Mexico, where shall be charged for all debenture certificates as above, \$2.50 when the declared value is \$2500 or less, and \$5 when the declared value is over \$2500.

36. To invoice, including declaration in triplicate .....	2 50
37. To invoice of goods not exceeding \$100 in value, in British North American Provinces and Mexico .....	1 00
38. To place of birth of emigrants, and only when desired by them .....	25
39. For marriage certificate .....	1 00
40. To appointment of new master, including oath of master .....	2 00
41. Given to a master at his own request .....	1 00
42. To the ownership of a vessel .....	1 00
43. To a seaman of his discharge .....	No fee.
44. To master to take home destitute American seamen .....	No fee.
45. To conduct of crew on board, in cases of refusal of duty and in cases of imprisonment, &c. ....	2 00
46. To roll or list of crew, when required by the captain or authorities of the port .....	1 00

#### *Declarations and Oaths.*

47. Declaration and oath of master to one or more desertions, including oaths attached to crew-list and shipping-articles .....	\$0 50
48. To one or more deaths or losses of seamen overboard at sea, including oaths attached to crew-list and shipping-articles .....	50
49. To ship's inventories or stores .....	50
50. To the correctness of log-book .....	50
51. To ship's bills and vouchers for disbursements and repairs .....	50
52. To the animals, vehicles, and goods of an emigrant, including certificate .....	50
53. When seamen were picked up at sea .....	No fee.

#### *Consul's Orders and Letters.*

54. To send seamen to hospital .....	No fee.
55. To send seamen to prison .....	\$1 00
56. To release seamen from prison .....	1 00
57. To authorities or captain of the port, in cases of sinking vessels .....	1 00
58. Requesting the arrest of seamen .....	1 00
59. Notice to master of result of examination on complaint of crew .....	1 00
60. Warrant of survey on vessels, hatches, cargo, provisions, and stores, or either .....	1 00
61. Notifying surveyors of their appointment .....	1 00
62. For any other letter or order of like character .....	1 00

#### *Passports.*

63. For issuing a passport .....	\$5 00
64. For visaing a passport .....	1 00

#### *Protests.*

65. For noting marine protest .....	\$2 00
66. For extending marine protest .....	3 00
67. And if it exceed two hundred words, for every additional one hundred words .....	50
68. Protest of master against charterers or freighters .....	2 00

#### *Estates of Deceased American Citizens.*

69. For taking into possession the personal estate of any citizen who shall die within the limits of a Consulate, inventorying, selling, and finally settling and preparing or transmitting, according to law, the balance due thereon, five per cent. on the gross amount of such estate. If part of such estate shall be delivered over before final settlement, two and one-half per cent. to be charged on the part so delivered over as is not in money, and five per cent. on the gross amount of the residue. If among the effects of the deceased are found certificates of foreign stocks, loans, or other property, two and one-half per cent. on the amount thereof. No charge will be made for placing the official seal upon the personal property or effects of such deceased citizen, or for breaking or removing the seals.—(Art. XXIII.)

#### *Recording Documents.*

70. Appointment of new master .....	\$0 50
71. Average bonds, when required, for every one hundred words or less .....	50
72. Bill of sale, when required, for every one hundred words or less .....	50
73. Certificate given to master at his own request, when required .....	50
74. Consul's letter to captain of port, or authorities, in cases of sinking vessels .....	50
75. Order and Consul's certificate to pay seamen's wages at home .....	50
76. Powers of attorney, when required, for every one hundred words or less .....	50
77. Protests of masters and others, other than marine protests, for every one hundred words or less .....	50
78. Calls of survey on vessel, hatches, cargo, provisions, and stores, or either; warrants and reports thereof; estimates of repair; certificates of Consuls to advertisements for funds on bottomry, and of sale of vessel; inventory of vessel, cargo, provisions, and stores; letter of master to Consul notifying sale of vessel, cargo, provisions, and stores, or either; letter of master to auctioneer, and account of sales of vessel, cargo, provisions, and stores, or either, for every one hundred words or less of any document required to be recorded, except Consul's certificate to masters taking home American seamen .....	50
79. Any other document or instrument of writing not herein named or enumerated, prepared in or out of the Consulate, and required to be recorded, for every one hundred words or less ..	50

### *Receiving and Delivering Ship's Papers.*

80. For receiving and delivering ship's register and papers, including Consular certificates as prescribed in Forms Nos. 13 and 14, one cent on every ton, registered measurement, of the vessel for which the service is performed, if under one thousand tons; but American vessels running regularly by weekly or monthly trips, or otherwise, to or between foreign ports, shall not be required to pay tonnage fees for more than four trips in a year; and tonnage fees shall not be exacted from any vessel of the United States touching at or near ports in Canada, on her regular voyage from one port to another within the United States, unless some official service required by law shall be performed. .... \$0 01
81. And for every additional ton over one thousand, one-half of one cent. .... ¼

### *Shipping or Discharging Seamen.*

82. For every seaman who may be discharged or shipped, including the certificates or acknowledgments thereof attached to crew-list and shipping-articles, to be paid by the master of the vessel ..... \$1 00

### *Filing Documents in Consulate.*

83. Consul's certificate to advertisement for funds on bottomry ..... \$0 25
84. Inventories of vessels, cargo, provisions, and stores, or either ..... 25
85. Estimate of repairs of vessel ..... 25
86. Advertisement of sale of vessel, cargo, provisions, and stores, or either ..... 25
87. Letter of master notifying Consul of sale of vessel, cargo, provisions, and stores, or either .... 25
88. Of master notifying auctioneer of sale of vessel, cargo, provisions, and stores, or either ..... 25
89. Accounts of sale of vessel, cargo, provisions, and stores, or either ..... 25
90. Calls of survey on vessel, hatches, cargoes, provisions, and stores, or either ..... 25
91. Warrants of survey on vessels, hatches, cargoes, provisions, and stores, or either ..... 25
92. Reports of survey on vessels, hatches, cargoes, provisions, and stores, or either ..... 25
93. For filing any other document prepared in or out of the Consulate ..... 25

### *Miscellaneous Services.*

94. For the *visa* or indorsement of a bill of health, and for the *visa* ..... \$0 50
95. For attending an appraisement of goods or effects, daily ..... 5 00
96. For attending valuation of goods, for every day's attendance during which the valuation continues ..... 5 00
97. For attending sale of goods, for every day's attendance during which the sale continues .... 5 00
98. For attending sale of vessel, when required ..... 5 00
99. For attendance at a shipwreck, or for the purpose of assisting a ship in distress, or of saving wrecked goods or property, over and above travelling expenses, a per diem of five dollars, whenever the Consul's interposition is required by the parties interested ..... 5 00
100. For Consul's seal and signature to clearance from custom-house authorities ..... 2 00
101. For clearance when issued by the Consul, as at free ports ..... 2 00
102. For entry of result of examination in vessel's log-book ..... 2 00
103. Agreement of master to give increased wages ..... 1 00
104. For issuing, preparing, and executing the receipt for two-thirds extra wages; the waiver of two-thirds extra wages; complaint of crew of bad quality or insufficient quantity of provisions or water; affidavit or certificate of attending physician; receipt for effects of deceased seamen ..... No fee.

### *Sealing Cars coming from Canada.||*

105. For each manifest with the Consul's certificate, and for sealing of each car, vessel, bale, barrel, box, or package ..... \$0 25

### *Copies.‡*

106. For the first hundred words, fifty cents, and for every additional hundred words or less, twenty-five cents.

Where a fee is fixed in the foregoing tariff for any particular act or transaction, no additional fee is to be demanded for signature, attestation, or annexing seal of office.

All consular fees are to be collected, as prescribed by law, "in the coin of the United States, or at its representative value in exchange."

¶ See State Department Circular No. 51, dated January 3, 1874.

‡ When parties have a right to call for copies, consular officers must make them at this rate. This does not, however, include the authentication, if that is required.

(Cat. No. 494.)

THE UNITED STATES OF AMERICA.

BILL OF HEALTH.

Custom House, Port of

To all to whom these Presents shall come :

Whereas, the                      of                      , of which  
is Master, is now ready to depart from the Port of                      for                      ,  
and other places beyond the sea, with                      persons, including the  
Master of the said vessel :

We, therefore, by these presents, do make known and certify that no plague  
nor any other dangerous or contagious disease, at present exists in the said Port.

Given under our hands and seals of office, this  
   day of                      , 188    ,  
and in the                      year of the  
Independence of the United States of  
America.

Collector of Customs.

Naval Officer.

(Fees, 20 cents.)

District of

Port of

, 188

**BILL OF HEALTH.**

\*

†

Master.

Bound for

Number of persons,

\* Insert nationality and rig of vessel.

† Insert name of vessel.



## APPENDIX II.

### PAPERS CARRIED BY VESSELS IN EVIDENCE OF THEIR NATIONALITY, AND OTHER PAPERS WHICH OUGHT TO BE FOUND ON BOARD.\*

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#### AUSTRIA.

Papers evidencing nationality :

Patente sovrana (royal license).

Scontrino ministeriale (certificate of registry).

Other papers carried :

Giornale di navigazione (official log-book).

Scartafaccio, giornale di navigazione quotidiano (ship's log-book).

Ruolo dell' equipaggio (muster-roll).

Bill of health.

Charter-party, if the vessel is chartered.

#### BRAZIL.

Paper evidencing nationality :

Passport purporting to be issued as to a national vessel.

#### DENMARK.

Evidence of nationality :

Certificate of nationality and registry.

The letters D. E. (Dansk Eiendom) burnt into the main-beam in the after part of the main hatchway.

Papers carried other than that above mentioned :

Royal passport, in Latin, with translation, available only for the voyage for which it is issued, unless renewed by attestation.

Certificate of ownership.

Build-brief (certificate of build).

Admeasurement-brief.

Burgher-brief (certificate that the master has burgher rights in some town of the kingdom).

Muster-roll.

Charter-party, if the vessel is chartered.

\* Taken from Hall's International Law, App. III, p. 672.

## FRANCE.

Papers evidencing nationality :

L'acte de propriété de navire.

L'acte de francisation.

Le rôle d'équipage.

Other papers which must be carried under the provisions of the Code de Commerce :

Les connaissements et chartes-parties.

Les procès-verbaux de visite.

Les acquits de paiement ou à caution.

## GERMANY.

Paper evidencing nationality :

Certificate of nationality.

Other papers carried :

Messbrief (certificate of measurement).

Beilbrief (builder's certificate).

See-pass (sailing license).

Journall (ship's log-book).

Muster-rolle (muster-roll).

Charter-party, if the vessel is chartered.

## GREAT BRITAIN.

Paper evidencing nationality :

Certificate of registry, or provisional certificate granted by a consul resident in a foreign country to a vessel brought there. The provisional certificate is good for six months from date of issue. A pass granted to a vessel before registration, enabling her to go from one port to another within the British dominions, has also the force of a certificate.

Other papers carried :

Official log-book.

Ship's log-book.

Shipping articles.

Muster-roll.

Bill of health.

Charter-party, if the vessel is chartered.

## ITALY.

Paper evidencing nationality :

Scontrino ministeriale (certificate of registry).

Other papers carried :

Patente sovrana (royal license).

Giornale di navigazione (official log-book).

Scartafaccio, giornale di navigazione quotidiano (ship's log-book).

Ruolo dell' equipaggio (muster-roll).

Bill of health.

Charter-party, if the vessel is chartered.

## NETHERLANDS.

- Zeebrief (sailing license).
- Bijlbrief (certificate of ownership).
- Mutbrief (certificate of tonnage).
- Journal (ship's log-book).
- Mouster-rol (muster-roll).
- Charter-party, if the vessel is chartered.

## NORWAY.

- Paper evidencing nationality :
  - Nationalitetsbreviis (certificate of nationality).
- Other papers carried :
  - Bülbrev (certificate of build).
  - Maalebrev (certificate of measurement).
  - N. B.—The bülbrev and the maalebrev need not be carried by vessels bought in foreign ports for two years after purchase.
  - Journale (ship's log-book).
  - Charter-party, if the vessel is chartered.
  - Mandskabliste (muster-roll).

## PORTUGAL.

- Papers with which a vessel must be provided :
  - Pasaporte de navegacion.
  - Acta de propiedad del buque.
  - Rol.
  - Conocimientos.
  - Recibos de fletes y despacho.
  - A copy of the Code of Commerce.

## RUSSIA.

- Evidence of nationality :
  - Patent authorizing the use of the Russian flag.
  - The fact that the master and half the crew are Russian.
  - N. B.—The patent is not conclusive in itself, because it can be granted, though it is not commonly granted, to foreign ships.
- Papers which must be carried by Russian ships :
  - The patent above mentioned.
  - Beilbrief (builder's certificate).
  - Custom-house passport.
- Other papers carried :
  - Ship's log-book.
  - Muster-roll.
  - Charter-party, if the vessel is chartered.

## SPAIN.

- Paper evidencing nationality :
  - La patente ó pasaporte de navegacion.

## Other papers carried :

El rol del equipage y lista de pasajeros.

Testimonio de la escritura de propiedad de la nave.

Contrato de fletemento.

Conocimientos, facturas y guias de la carga.

## SWEDEN.

A passport from a chief magistrate or commissioner of customs.

Bilbref (builder's certificate).

Fribref (certificate of registry).

Journalen (ship's log-book).

Folkpass or sjemansrubla (muster-roll).

Charter-party, if the vessel is chartered.

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## BIBLIOGRAPHIC NOTES.

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### AMERICAN SOCIETY OF CIVIL ENGINEERS, TRANSACTIONS.

DECEMBER, 1884. Experiments on journal friction at low velocities, by A. M. Wellington.

These experiments were made on the rolling stock of the Lake Shore and Michigan Southern Railway, to obtain a clearer insight into the general laws of friction. For this purpose the results are compared with the investigations of Professor Thurston, and also with the elaborate series of tests recently made in England by Mr. Beauchamp Towers. The experiments were made to observe: 1. Initial journal friction; 2. The normal coefficient of journal friction at ordinary operating velocities; 3. The extent of the conversion into heat of the energy lost by friction; 4. The effect of load per square inch of bearing on the coefficient of friction.

The real value of lubricants and the correct method of comparing prices, by Robert H. Thurston.

### BLACKWOOD'S MAGAZINE.

JUNE, 1885. The torpedo scare.

In this article, Hobart Pacha maintains that the offensive and defensive power of the torpedo is enormously exaggerated, and in proof cites his experiences in the Turko-Russian War.

### BOLETIN DEL CENTRO NAVAL.

MARCH, 1885. Plan of attack by torpedoes. Notes on chronometers. Deep sea sounding apparatus.

### ENGINEER.

APRIL 3, 1885. The Naniwa-Kau.

This cruiser, and a sister ship nearly completed, were built for Japan by Messrs. Armstrong & Co. They are of 300 feet length, 46 feet beam, 18½ feet draught, and about 3600 tons displacement. They have twin-screw engines, which are to develop at least 7500 horse power, and to give a speed of 18 to 18½ knots. The armament, protected by shields, consists of 2 28-ton guns, as bow and stern chasers; 6 6-in. guns, in broadside; 10 1-in. machine and 2 rapid-firing guns. At both mastheads two Gatlings will be mounted, and in addition there are four above-water torpedo tubes.

MAY 8. Recent experiments with Gruson's chilled iron armor.

JUNE 5. The U. S. despatch boat Dolphin.

## ENGINEERING.

APRIL 24, 1885. Torpedo boats in war.

MAY 1. Electric lighting at the international inventions exhibition (illustrated). Artillery at the same (illustrated). The defence of our coasts.

For this purpose the writer would block all ports by torpedoes, and supplement them by harbor defence vessels and torpedo boats.

MAY 8. The Howe.

This armored vessel, begun in 1882, was launched in April last at the Pembroke dockyard. She is built entirely of steel, is of the barbette class, 325 feet long, 68 feet beam, 9700 tons displacement, with a mean draught of 26 feet 9 inches. Her armor varies in thickness from 18 inches to 9 inches; the armament will comprise 4 13½-inch 64-ton B. L. R., 6 6-inch B. L. R. on Vavasseur mountings, 6 12-pdrs., 10 Nordenfelts, and 5 Whitehead torpedoes in firing position. The coal capacity is 1200 tons; H. P. is 9500, and the speed expected 16 knots. She will carry 445 men; the total estimated cost is £453,000.

MAY 29. The fleet in action.

An editorial upon the character of future naval actions. The writer thinks that the most valuable use of the torpedo boats will be after the first charge; when, following the charging line, screened by smoke, they can attack the enemy under the most favorable circumstances. Should the enemy use his torpedo boats as skirmishers they could be destroyed before the general mêlée. Ramming should not be resorted to in a first charge unless it could be done without any danger to the ramming vessel. While in the first of the action the use of guns must be limited to known bearings and the ship so manœuvred that they may be fired electrically with the best results, later on independent firing may be resorted to. In regard to torpedoes, the writer says that it would really appear that if two squadrons armed with Whiteheads are to pass through one another, at a cable's distance between the ships, that every one of these vessels ought to be struck by a Whitehead in passing.

The Brunnan torpedo.

Apparently this torpedo is ejected with a velocity of 50 miles per hour. Within it are two coils of wire wound on spindles, each connected with the shafting of a screw propeller. The ends of these wires are made fast to drums on a steam engine ashore, and as the wires are unwound from the reels in the torpedo on to those on the engine, the screws are set revolving and the weapon propelled. Steering is effected by hauling harder on one side or the other to make the corresponding screw revolve faster. The position is indicated by a couple of lights similar to those used with the Lay torpedo. (No official trials have been made.)

The Giovanni Bausan.

Built for Italy by Messrs. Armstrong & Co., generally after the design of the *Esmeralda*, but larger, being 280 feet long; 42 feet beam; draught, 18½ feet; displacement, 3100 tons. The armored deck is 1½ inches thick. The armament consists of 2 10-inch 25-ton B. L. R. as bow and stern chasers; 6 6-inch 4-ton guns in broadside; 2 6-pounder rapid-firing, with several Nordenfelt and Hotchkiss guns. There is a revolving machine gun turret at each mast-head; the gun carriages are provided with steel shields; there are one under-water and two above-water torpedo tubes, and a hydraulic crane for lifting boats. On the official trial of six hours with forced draught, the I. H. P. was 6000 and the speed 17½ knots per hour.



## JUNE 5. The Maxim gun.

A paper read by Mr. Hiram S. Maxim before the Institution of Mechanical Engineers, in which he describes in full the mechanism of his automatic firing gun.

## FRANKLIN INSTITUTE JOURNAL.

## JUNE, 1885. The Tehuantepec ship-railway (with plates).

## INSTITUTION OF CIVIL ENGINEERS, PROCEEDINGS.

## VOL. LXXIX. Electric lighting for steamships, by A. Jamieson.

## INSTITUTION OF MECHANICAL ENGINEERS.

## MARCH, 1885. The history of paddle-wheel steam navigation.

## NORSK TIDSSKRIFT FOR SOVAESEN.

VOL. 3, PART 5. Permanent crews in earlier days. Instruction of seamen in the care of sick and wounded.

## REVUE MARITIME ET COLONIALE.

APRIL, 1885. War ships (Italian). Analytical résumé of Laplace's Theory of Tides (continued through several numbers).

MAY. The employment of torpedo boats for coast defence. (Report of Lieutenant E. W. Very, U. S. N.). Rapid determination of a ship's position when in sight of a coast.

## The Formidable.

This first-class ironclad, begun in 1879, was launched in April last at Lorient, and will be ready for trial in about two years more (1887). She is 342 feet long, 70 feet beam, 25½ feet draught and 11,336 tons displacement. There is a three cylinder compound engine for each twin screw, and with forced draught they are calculated to develop 8320 horse power, and to drive the ship 15.2 knots per hour. A double bottom extends under the part of the ship occupied by towers, machinery, and boilers. Eleven water-tight bulkheads, about ½ inch thick, reach to the armored deck, or about 3½ feet above the water line; and a number of fore and aft bulkheads complete the system. The steel armor varies in thickness from 21½ inches amidships to 14 inches at the bow; the towers for the three 37 mm. guns are protected by 15¾ inches of steel, and the armored deck, 3 inches thick, is increased to 4 inches over the engine and boilers. The battery will be composed of three 75-ton guns in barbette, protected by steel shields, 12 5½-inch guns in battery, 8 Hotchkiss guns and several torpedo tubes. Two hollow steel masts will serve for signals, and also to hold platforms for two of the machine guns. The Formidable will carry 800 tons of coal, which should take her 3000 miles at 10 knots; completed, her cost will be at least sixteen millions francs.

## The Bombe.

This torpedo despatch vessel, one of six ordered by the French government, was launched at Havre in April last. Built entirely of steel, so arranged as to gain the greatest strength with least weight, it is 200 feet long, 21⅓ feet beam and draws six feet water. There are two engines, one for each screw, and they are expected to drive the vessel 18 knots, developing a total horse power of 1800. It has a three-masted schooner rig, with steel wire rigging, and all the recent marine improvements have been placed on board. Trials will be made shortly.

## RIVISTA DI ARTIGLIERA.

FEBRUARY, 1885. The fabrication of great guns abroad.

## ROYAL ARTILLERY INSTITUTION, PROCEEDINGS.

FEBRUARY, 1885. Steel gun factories in the United States.

A review of No. 4, Vol. X, Proceedings Naval Institute, by Major G. Mackinlay, R. A.

APRIL. On the use of general tables to calculate times of flight and remaining velocities, by Rev. F. Bashforth.

MAY. Revolving system of sighting guns, by Major L. K. Scott, R. E.

## ROYAL UNITED SERVICE INSTITUTION, JOURNAL.

NO. CXXVIII. Side armor *vs.* armored decks. Mild steel applied to naval and military purposes. Musketry instruction afloat. Naval education.

NO. CXXIX. The use of torpedoes in war. The capabilities of private firms to manufacture heavy ordnance for H. M. service.

## UNITED SERVICE GAZETTE.

APRIL 4, 1885.

Upon recommendation of Lord Wolseley, the English ordnance authorities have at last adopted the solid wire-drawn cartridge instead of the "Boxer abomination." It is, perhaps, only natural that Gen. Boxer should write: "I regard this hurried adoption of the American solid drawn cartridge, under the circumstances, as a very grave matter indeed."

APRIL 25.

Contracts have just been awarded for the following vessels for the English Navy: two first-class ironclads, displacement 10,470 tons; I. H. P., 8500; speed, 15½ knots; armor, 18 inches thick; price £602,500 (average); time for construction, three years and a half. Two belted cruisers, displacement, 5000 tons; I. H. P., 7500; speed, 17½ knots; belt armor, 10 inches thick; price £224,000 each; time for construction two years and three months.

MAY 2. The Maxim gun.

The belt supplying the cartridges to this gun (see Proc. Nav. Inst., Vol. XI., 167), is made of two lengths of canvas, rivetted together at regular intervals with eyelets and strips, so as to form a succession of loops, into each of which a cartridge is inserted by hand. When any belt is running out, a fresh one is hooked on to its tail end, without causing any delay to the continuous firing of the gun. The simple water jacket encasing the barrel of the gun is found to answer very well for preventing excessive heating.

Upon introducing a belt of cartridges into the gun, and turning the crank handle, the cartridges are drawn in one by one, until the magazine is full; the empty part of the belt hangs out from the opposite side of the gun. On pulling the trigger by hand, the first one of these cartridges is fired, and the gun will then supply itself from the belt and continue firing automatically as long as the supply of cartridges can be kept up. The firing can be stopped after a single

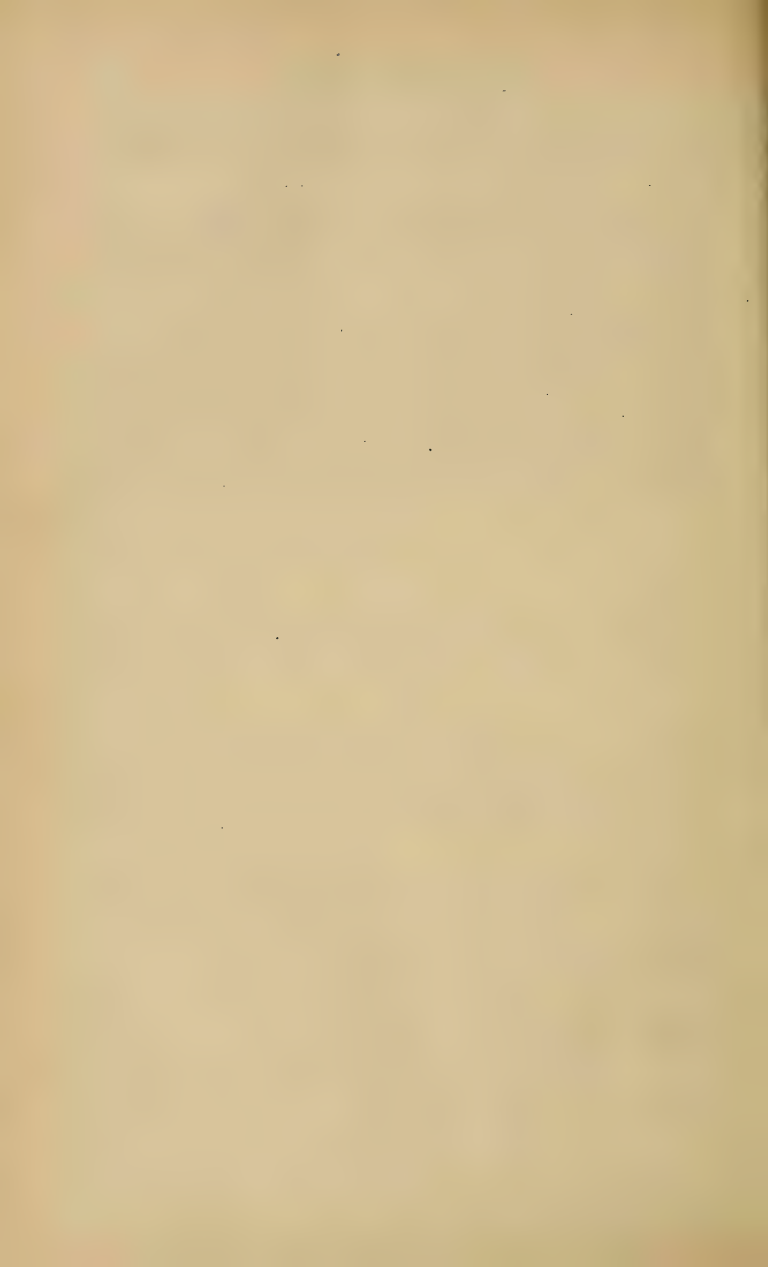
or any number of fires, and it may be set to fire any number a minute up to 600. Mr. Maxim is now making a gun for naval purposes to throw  $1\frac{7}{8}$  inch shells at the rate of 150 per minute.

#### JUNE 6. Inland navigation of torpedo craft in France.

A French torpedo boat has successfully passed from the English Channel up the Seine and out into the Mediterranean, the voyage occupying fourteen days. The advantages to France are very great, as it enables her to maintain the depot for torpedo boats in the interior, and to mass them upon either coast at will.

#### JUNE 20. The Benbow.

This twin screw armor-plated barbette ship has just been launched from the Thames Ironwork and Shipbuilding Company's yard. The dimensions are as follows: length, 330 feet; breadth,  $68\frac{1}{2}$  feet; depth, 37 feet  $1\frac{1}{2}$  inches; displacement, 10,016 tons. The armament will consist of two 110-ton guns, 10 6-inch B. L. R., 12 6-pdr. rapid-firing guns, 10 4-barrel 1-inch machine guns, and 4 5-barrel 0.45-inch machine guns. The 110-ton guns will be placed, one in each barbette, forward and aft the citadel, and the carriages are arranged so that the guns can be trained through an arc of  $115^\circ$  on each side. The contract horse-power is 7500 with natural draught, and 9500 with forced draught, and the engines are expected to make about 100 revolutions per minute.



## NAVAL INSTITUTE PRIZE ESSAY, 1886.

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A Prize of one hundred dollars and a gold medal is offered by the Naval Institute for the best Essay presented, subject to the following rules :

1. Competition for the Prize is open to all members, Regular, Life, Honorary and Associate, and to all persons entitled to become members, provided such membership be completed before the submission of the Essay. Members whose dues are two years in arrears are not eligible to compete for the Prize until their dues are paid.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1886. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Judges.

3. The Judges to be three gentlemen of eminent professional attainments (to be selected by the Board of Control), who will be requested to designate the essay, if any, worthy of the Prize, and, also, those deserving honorable mention, in the order of their merit.

4. The successful essay to be published in the Proceedings of the Institute, and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the Proceedings of the Institute, after it leaves the hands of the Judges.

5. Any essay not having received honorable mention, to be published only with the consent of the author.

6. The subject for the Prize Essay is, *What changes in organization and drill are necessary to sail and fight most effectively our war-ships of the latest type?*

7. The Essay is limited to forty-eight printed pages of the "Proceedings of the Institute."

8. The successful competitor will be made a Life Member of the Institute.

9. In the event of the Prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of a gold medal.

CHARLES R. MILES,  
*Secretary and Treasurer.*

ANNAPOLIS, MD., September 1, 1885.





Vol. XI., No. 4.

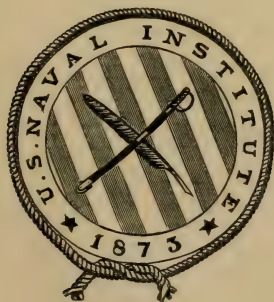
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# THE PROCEEDINGS

OF THE

## UNITED STATES NAVAL INSTITUTE.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

OCTOBER 9, 1885.

MR. CLEMENTS R. MARKHAM, C. B., F. R. S., Secretary of the  
Royal Geographical Society, London, in the Chair.

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### THE POLAR QUESTION.

BY LIEUTENANT JOHN W. DANENHOWER, U. S. N.

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Let us imagine a scientific observer able to take a position in the prolongation of the earth's axis above the North Pole, and so gifted with superhuman vision as to see the traces of the explorers of the present century.

Facing south in the plane of the initial meridian he would see, almost in front of him, the route by which Parry made his arduous effort to reach the Pole in July, 1827, when, by great exertion and commendable perseverance, with boats and sledges he attained latitude  $82^{\circ} 45' N.$ , and, meeting with the main polar pack drifting to the southward, was forced, reluctantly, to give up the attempt which was not eclipsed until nearly half a century later. Here also is the scene of Koldewey's efforts in 1868, and of the five Swedish expeditions under Nordenskiöld, as well as of the hazardous voyage of the U. S. steamer *Alliance* in search of the *Jeannette* during the summer of 1881.

Looking to the left the observer would see Franz Josef Land, which, lying above the 80th parallel, was discovered in the autumn of 1871 by the Austro-Hungarian Expedition under Lieutenants Weyprecht

and Payer, and is, doubtless, the most important arctic discovery of the century.

Now, facing to the right, he sees the great Baffin Bay and Smith Sound route by which Hall in the *Polaris* (1871-72), Nares in the *Alert* (1875-76), and Lockwood of the Greely Colony (1882-83) pushed exploration beyond the eighty-second and into the eighty-third degree.

Having thus taken a bird's-eye view of the work on the European side, should the observer face about, looking along the opposite branch of the initial meridian, and then towards the right and left, he would see the half circle of territory bounded by the eightieth parallel into which the explorer has never entered, and, clinging to it on the southern border, a large crescent of unknown region, along the desolate edge of which is the zig-zag track of the *Jeannette*, and the place at which she was crushed and sunk by the merciless ice. Stretching out before and beneath him are the icy circumpolar regions, practically land-locked on the Asiatic and British American sides, whilst towards the European side would be seen a mighty stream of ice sweeping out between Spitzbergen and Greenland, also a powerful tributary pouring down Smith Sound, re-inforced by the icebergs of Baffin's Bay, and drifting as far south as the Newfoundland Banks before the fields and bergs are disintegrated and dissolved by the action of the sun and the warm Atlantic waters.

How can we best judge of what so gifted and well placed an observer would see in the region that is now to us a sealed book?

The case is similar to that of a mighty river, the headwaters of which are considered inaccessible to man. By ascending the river as far as possible, studying the natural characteristics and phenomena of the vicinity, and examining what is brought down by the currents, he can form a fair conception of what may be found in the unexplored region beyond, and, after due consideration, determine whether the advantages to be gained will compensate for the tremendous effort and probable sacrifice of life necessary to overcome the almost insurmountable obstacles to further progress. The polar subject is strictly analogous to this, and let us therefore examine the topography, the resources and general characteristics of the approaches to the central polar regions, which, together with what the ice-bearing currents bring down, may enable us to form a sufficiently clear idea of the situation to define the benefits that might accrue from further efforts, and to conclude if it is worth the while to make them.

Having been in only one field of polar exploration, my information about the others is derived from books and intercourse with men who have gone by different routes, therefore in this paper I shall confine myself as much as possible to the words of the writers when profiting by their experience and knowledge.

#### THE SPITZBERGEN APPROACH.

By this route the latitude of  $80^{\circ}$  may be attained with less difficulty than by any other, for vessels can proceed up the west coast of Spitzbergen, encountering little or no ice, until after that parallel is passed. The Alliance had this experience in 1881, and she was not stopped by the ice until  $81^{\circ} 10' N.$  was reached, where she met the great ice-current bearing down upon the NW. elbow of the island. Previous experience as far back as 1607 was the same, for in that year Hudson reached the parallel of  $81^{\circ} N.$  without difficulty. In 1827, Parry in the Hecla, "after rounding Hakluyt Headland, attained the very high latitude of  $81^{\circ} 05' N.$ , with nothing but loose drift-ice to the northward and no appearance of the main pack."

The five Swedish expeditions under Baron Nordenskiöld in 1858-61-64-68 and '72, and that of Koldewey in the Germania in 1868, all show that Spitzbergen affords the best and surest route for reaching the eightieth parallel—above which occur the great obstacles to further progress.

Let us now examine the polar lands on this important highway to the northward.

"For more than a century Spitzbergen has formed the base from which a number of expeditions have endeavored to reach the North Pole.

"A branch of the Gulf Stream gives its west coast a much higher temperature than is due to its geographical position. The existence of land to the north of it is exceedingly probable; and, if it does exist, it would form a convenient stepping-stone to the Pole."\*

The area of Spitzbergen and its adjacent islands is estimated at 30,000 square miles, which is a little less than that of Ireland. Its chief importance to the explorer is in the fact that its principal extent is north and south, which permits him to work his ship to the northward, having only at times to encounter ice, not of a formidable character, that drifts out of the numerous fiords and bays penetrating far into the interior.

\*Nordenskiöld, *Arctic Voyages*, 1879, p. 43.

The island is naturally divided into two parts by Ice Fiörd and Wide Bay, the headwaters of which are separated by a dividing ridge only five miles in width. The general features, climate, and resources of the west coast are well described in the work of Wm. Scoresby, Jr., who made seventeen voyages to the Greenland seas and Spitzbergen during the early part of this century. The north and a portion of the east coast have been described by Nordenskiöld, but the greater part of the latter is rendered almost inaccessible by the vast quantities of polar ice lodged upon it by the branch of the cold current that sweeps into the Atlantic near Bear Island.

The numerous peaks and acute mountains seen by Barents on the west coast in 1596 suggested the name of Spitzbergen (sharp mountains) to the island. Since 1611 its west coast has been annually visited, and it was long the favorite resort of the English, Dutch, and Russian whale-fisheries, "and though the soil of the whole of this remote country does not produce vegetables suitable or sufficient for the nourishment of a single human being, yet its coasts and adjacent seas have afforded riches and independence to thousands." "Spitzbergen, with some other countries within the arctic circle, exhibits a kind of scenery which is altogether novel. The principal objects which strike the eye are innumerable mountain peaks, ridges, precipices, needles rising immediately out of the sea to an elevation of 3000 to 4000 feet, their color at a moderate distance appearing to be blackish shades of brown, green, grey, and purple; snow or ice in striæ or patches occupying the various clefts and hollows in the sides of the hills, capping some of the mountain summits and filling with extended beds the most considerable valleys; and ice of the glacier form occurring at intervals all along the coast, in particular situations, in prodigious accumulations."\*

The mountain peaks, though numerous, are not of great altitude. Nordenskiöld and Duner in 1864 made astronomical observations at eighty stations, and determined mountain heights, the loftiest of which being the Horn Sound Peak, 4560 feet above sea level. The north coast is not so mountainous, the shores not being so high, but the inland ice-hills rise to a height of 2000 feet.

"The beach is everywhere covered with enormous masses of drift-wood, among which was found pumice stone, cork, birch bark, poles and floats from the Loffoten fisheries, with other things carried by the currents from the south."

\* Scoresby's Arctic Regions, Vol. I., p. 109.



"While Torell was examining all this, he found, among other things, a well-preserved bean of the West Indian plant 'Entada gigalobium.' This bean, which is upwards of an inch and a half across, floats with the Gulf Stream through the Atlantic, is found not unfrequently on the coast of Norway, and being also found on Spitzbergen, affords the most convincing evidence that the Gulf Stream reaches this high latitude."\*

Where the east coast has been visited immense quantities of stranded ice have been seen, and the beaches have been covered with drift-wood, "consisting of large stems of larch and birch, with occasional fragments of wrecks."

"This drift-wood is apparently deposited by the current, the set of which is from the east and northeast, according to Von Heuglin, turning thence to the southward, washing the shores of Edge Island, and finally commingling with the northward branch of the Gulf Stream in about the latitude of Bear Island, occasioning the prevalence of storms and mists about that place."†

*Climate.*—Scoresby, Jr., made some interesting statements, but his impression of the climate of Spitzbergen was doubtless exaggerated. He had never wintered there, and the information about other polar lands was, in his time, quite limited.

He remarks (page 135): "The climate of Spitzbergen is no doubt more disagreeable to human feelings than that of any other country yet discovered. Extending to within ten degrees of the pole, it is generally intensely cold, and even during the three warmest months of the year the temperature not averaging more than 34.5° F.; it is then subject to a cold occasionally of three, four or more degrees below the freezing point." As far back as 1633 a party of seven Dutchmen passed the winter there successfully, but during the following winter a similar party died of scurvy.

In 1743 four sailors were shipwrecked and had to remain six years and three months on the island, subsisting on its resources. One died, but the others were rescued.

Russian fishermen have successfully wintered in Spitzbergen, the chief danger being the terrible scurvy. Meteorological records were not carefully made and preserved by these early residents, and the most accurate information that we have is derived from the reports of Parry and Nordenskiöld. The former remarks: "The officers

\* Nordenskiöld's Arctic Voyages, p. 72.

† Markham's Threshold of the Unknown Regions, p. 85.

who remained on board the Hecla (moored in Hecla Cove, latitude  $80^{\circ} 02' N.$ , longitude  $17^{\circ} E.$ ) during the summer described the weather as the most beautiful and the climate altogether the most agreeable they had ever experienced in the polar regions. Indeed, the meteorological journal shows a temperature, both of the air and the sea-water, to which we had been before almost altogether strangers within the arctic circle, and which goes far towards showing that the climate of Spitzbergen is a remarkably temperate one for its latitude." (Mr. Crowe, of Hammerfest, who wintered in latitude  $78^{\circ} N.$  on SW. coast of the island, informed Captain Parry that he had rain on Christmas.)

"It must however be observed that this remark is principally applicable to the weather experienced near the land, that at sea being rendered of a totally different character by the continual presence of fogs, so that some of our most gloomy days on the ice were among the finest at Hecla Cove, where, however, a good deal of rain fell during the summer." During Parry's celebrated journey over the ice the weather was foggy, raw, and cold, and an unusual amount of rain fell. On one occasion during the clear weather he remarked: "It was so warm in the sun, though the temperature in the shade was  $35^{\circ} F.$ , that the tar was running out of the boat's seams; and a blackened bulb held against the paint-work raised the thermometer to  $72^{\circ} F.$ "

The Swedish Expedition in the summer of 1861 enjoyed a very mild season in Treurenberg Bay (latitude  $80^{\circ} N.$ ) "During the whole stay of the expedition the thermometer was above the freezing point, and after the 22d of June it once rose to  $59^{\circ} F.$  in the sun. The mean temperature for the month of June, including the cold days at the beginning, when the vessels were cruising off Red Bay, was, according to 305 observations made on the *Aeolus*,  $35^{\circ} F.$  The temperature of the water, filled as it was with colossal ice-masses, also underwent a remarkable rise. During the first week it had kept under the freezing point, and had even fallen to  $30.3^{\circ} F.$ , while the ice floating in it visibly melted and thus took up heat from the water. This rise, which cannot, of course, be ascribed to the immediate action of the sun, was specially perceptible at those times of the day when the tide set in from the sea."\*

The Swedish Expedition (1872-73) that wintered at Mussel Bay, only a few miles distant from the quarters before mentioned, experi-

\* Nordenskiöld's *Arctic Voyages*, pp. 63-4.

enced quite a mild climate, the greatest cold being only  $-36^{\circ}$  F. for a few hours in January, and during calm, clear weather. The peculiarity of climate noticed by Nordenskiöld was evidenced by there being no sign of putrefaction in the carcasses of a number of white whales which had been exposed day and night to the direct rays of the sun, and the entomologist of the expedition could not find a single fly or other flesh-loving insect upon them. In latitude  $82^{\circ} 30'$  N. beyond the Seven Islands, Parry mentions "a couple of small flies (to us an event of ridiculous importance) were found upon the ice." Spitzbergen and its contiguous waters are rich in animal life, and its land exhibits abundant and numerous specimens of vegetation. It was the favorite resort of the right whale, but now, since the whaling business has been given up in those waters, they are frequented by walrus hunters and white-whale fishers. Nordenskiöld at Green Bay saw "twenty-four white whales of various sizes, the largest 14 to 16 feet in length, in a row upon the beach, most of them already deprived of their blubber. It was stated that a single animal may yield a barrel of blubber, worth in Norway 25 specie dollars, and as a large number may be taken at once (in former times as many as one hundred and fifty), it is evident that the profit from this branch of industry is not inconsiderable. The skin, when prepared, yields a soft and pliant leather."

Numerous bears and reindeer inhabit the islands, and myriads of sea-fowl occupy desolate haunts. Birds began to appear at Welcome Point as early as March 3, 1873.

Bears and reindeer were found by Nordenskiöld inhabiting the Parry Islands, about  $81^{\circ}$  N. Veritable prints of reindeer and bears were visible on the north shore of North-East Land in the spring of 1873. Several very fat reindeer were shot. On the ice journey Parry saw birds and seals above latitude  $82^{\circ}$ ; and the Swedish expeditions give interesting accounts of the collections obtained by dredging. "September 20, 1868. Animal life still abundant; several birds, the glaucous gull and the lumme (Mormon Articus) were seen, and, dredging steadily, added to our zoological collections." "September 23, 1868, the *Sofia* was in latitude  $78^{\circ} 26'$  and longitude  $2^{\circ} 17'$  W. The weather was splendid, with clear sunshine. The vessel lay in an ice-field surrounded on all sides by large and small blocks of ice, some lying flat, others raised up against each other, etc. Animal life was found in unexpected abundance, and dredging became especially interesting; for the depth was 2650 fathoms, and there was brought

up a mass which consisted almost entirely of brown and white foraminifera, among which, however, there was found a crustacean (a species of *cuma*). It was also surprising among the ice in the middle Atlantic and at such a depth, so great abundance of higher animals—seals, glaucous gulls, petrels, guillemots (scarcely recognizable in their winter dress), auks and rotges.” The most satisfactory way to account for the prevalence and abundance of animal life so far north is that the Gulf Stream carries food there. How far beyond the eightieth parallel the influence of the warm stream is felt remains a matter for conjecture, but the presence of birds and animal life in the sea north of Spitzbergen indicates that food-bearing currents must reach that locality.

The character of the food supply is described (page 155) by Nordenskiöld: “During the voyage (1872) made observations on the color of the arctic seas, which is in some places of a greyish-green and in others an indigo-blue, the areas being frequently so easily distinguished that a ship may sail with one side in blue and the other in greyish-green water. Water is also to be found in the Greenland seas of a decided shade of brown. These colors, green and brown, are caused by a slime, which is absent where the blue prevails. This slime, which is formed of various species of diatomaceæ, inconsiderable as it is, but spread over hundreds of thousands of square miles, forms an indispensable condition for the existence, not only of the swarms of birds that frequent the northern regions, but also for the giant of the animal creation, the whale, and for all branches of industry dependent on the whale-fishery.”

Another indication that the Gulf Stream reaches the north coast of Spitzbergen is the phosphorescent animalculæ which, by their bluish-white glow, light up the dark waters as they dash against the ice-floes. The botanists of the Swedish Expedition found that Spitzbergen abounds in vegetation of great richness and variety, making the best field for naturalists yet discovered beyond the arctic circle. The soundings off Spitzbergen show that it is situated in the deepest part of the polar basin now known. As before mentioned, the *Sofia* obtained bottom specimens at a depth of 2650 fathoms about midway between Greenland and Spitzbergen. The depth of 1370 fathoms with sample of the bottom was recorded by the *Sofia* at the highest position yet reached by a ship north of the island,  $81^{\circ} 42' N.$ , and a few hours later 370 fathoms were found, though the ship had moved but little to the westward. At Parry's highest ( $82^{\circ}$

45' N.) he was unable to reach the sea-bottom with 500 fathoms of line.

The magnetic variation is not very great in that vicinity, the maximum being  $20^{\circ}$  W., and there being a line of no variation, running north and south, at a short distance to the eastward of the islands. Near Parry's highest he observed the variation of the needle to be  $13^{\circ} 41'$  W. The ice conditions in the vicinity of Spitzbergen will be included in the general description of the "Ice of the Polar Regions." From a careful study of information from the most authentic sources, it appears that Spitzbergen is the most interesting and best favored country within the arctic circle. No traces of native inhabitants have been found. It is a fine country for walrus hunters and sportsmen, as well as being a grand field for the botanist and the geologist.

It would be a safe and excellent station for meteorological observations, but the experience of Parry and Nordenskiöld clearly indicates that there is little chance of success for a polar expedition from its shores. The Swedish scientific expeditions have met with fair success in Spitzbergen and its locality. Speaking of the voyage of the *Sofia*, the distinguished savant, Professor Oswald Heer, of Zürich, declared: "In my opinion the Swedish Expedition, by the rich collections it has brought home, has achieved more and has widened our horizon of knowledge more than if it had returned merely with the information that the *Sofia* had hoisted her flag at the North Pole."

Before leaving the subject of this route, let me say a few words about Sir W. E. Parry's "Attempt to reach the North Pole." In my judgment it was the best planned and executed attempt that has ever been made before or since its date. The outfit of boats and the organization of his party have not been excelled in the recent efforts of explorers. His line of retreat was well arranged with boats and provisions placed at suitable points, and the expedition was conducted with admirable skill and judgment.

#### THE FRANZ JOSEF LAND APPROACH.

Attempts to explore the icy seas north of Europe and Asia were made as early as 1556, in search of a northeast passage to China. It is an historical fact that in the spring of that year Stephen Burrough, afterwards Chief Pilot of England, fitted out a little pinnace called the *Search-thrift*, and sailing to the northeastward, discovered the Kara Strait between the islands of Novaya Zemlya and Wai-



gatch, and then returned for three causes, viz.: the continual north winds, "the great and terrible abundance of ice which we saw with our eyes," and thirdly, "because the nights waxed dark."\*

Burrough was followed by many other intrepid explorers, among whom were Pet, Jackman, Barents and Henry Hudson. Important discoveries near the coast were made, and the distinguished Barents explored parts of Novaya Zemlya, and after passing the winter with sixteen Dutch companions at the northeast end of the island he died in June, 1597, and was buried on shore. The survivors reached Lapland and went to their homes. Their abandoned winter quarters were not visited for two hundred and seventy-four years, when a Norwegian skipper, Elling Carlsen by name, circumnavigated the island with his sixty-ton sloop, and on the 7th of September, 1871, visited Ice Haven, where he found Barents' house yet standing. He brought away cooking utensils, implements, etc., that had been used by the gallant band nearly three centuries ago.

Let us, however, turn from the attractive episodes of this region and seek for information about the great effort that was made to gain a high latitude north of Novaya Zemlya. For our knowledge about this subject we are indebted to the excellent work of Lieutenant Julius Payer, entitled "Austrian Arctic Voyage," one of the most readable in the literature concerning that region, from which I shall make numerous quotations.

Attention was first given to Barents Sea, the part of the ocean between Spitzbergen and Novaya Zemlya, because it was hoped that favorable ice conditions might be found there and a great advance towards the pole be made practicable. This hope was based on the supposition that a branch of the Gulf Stream penetrated beyond Novaya Zemlya. During the summer of 1871 Lieutenants Weyprecht and Payer chartered the *Isbjörn* (Ice Bear), a small sloop, and made a dashing reconnoissance of Barents Sea. From the experience of this voyage they made some conclusions and inferences which, formulated briefly, were as follows, viz.:

(1) "The Novaya Zemlya Sea is not always filled with impenetrable ice, making navigation impossible."

(2) "The Novaya Zemlya Sea is a shallow sea—a continuation and connection of the great plains of Siberia. In the extreme north its depth is 600 feet, and southeast of Gillis Land about 300 feet."

(3) "The time most favorable for the navigation of this sea falls at

\* Markham's *Threshold of the Unknown Regions*.



the end of August and lasts till the end of September. During this period the ice may be said to be at its minimum."

(4) "Gillis Land is not a continent, but either an island or a group of islands. Whereas from the circumstance that in the highest latitude,  $79^{\circ}$  N., we found drift-wood covered with mud, sea-weed, creatures which live only near the land, decreasing depths of the sea, sweet-water ice and bergs covered with dirt, it may be inferred with great probability that there exist large masses of land to the northeast of Gillis Land."

(5) "The appearance of Siberian drift-wood only in the most northern seas reached during our voyage seems to point to an easterly current there" (means westerly set).

(6) "The Russian expeditions in the past and present centuries which attempted to penetrate by the northwest coast of Novaya Zemlya miscarried because they sailed before the favorable season for navigation, and also because they had not the advantage of steam."

(7) "How far the Gulf Stream has any share or influence in the favorable conditions for the navigation of the Eastern Polar Sea which have been described cannot as yet be positively determined. The state of the ice, the observations of the temperature of the sea, its color and the animal life found in it, seem to speak in favor of the action of this current in that region. It is possible that the Gulf Stream may exercise its culminating influence on the west coast of Novaya Zemlya at the beginning of September."

"But, in addition to the causes already specified, the influence of the warm currents produced by the great rivers of Siberia discharging themselves into a shallow sea was also supposed to co-operate in producing this phenomenon. Of these rivers the Obi and the Yenisei alone discharge into that shallow sea a body of water as great as the waters of the Mediterranean or as those of the Mississippi. The course of the current produced by these mighty rivers is not yet known; but it is natural to suppose that old and heavy pack-ice could not be formed on a coast submitted to such an influence."

The Isbjörn reconnoissance having been very successful, the deductions and inferences of Lieutenant Weyprecht so favorable, and the route north via Novaya Zemlya so promising, it was determined that the Austro-Hungarian Expedition of 1872-73 should try its fortunes in that region, with the hope also of making its way to Bering Strait, in case a high northern position could not be attained. The

line of retreat was to be provided for by making a deposit of coal and provisions on the coast of Novaya Zemlya near Cape Nassau, and stone cairns with suitable records placed within them were to be erected at prominent places during the advance. Should the ship be crushed off the Siberian coast, the party would retreat up one of the principal rivers. The attempt was to be made during the latter part of August, and the *Tegetthoff* (220 tons) was fitted out for two and a half years, and placed under the joint command of Lieutenants Weyprecht and Payer. "Our ideal aim," says Lieutenant Payer, "was the northeast passage, our definite object was the exploration of the seas and lands on the northeast of Novaya Zemlya." In a few days it was found that 1872 was a very unfavorable ice year for explorers, heavy fields similar to those on the East Greenland coast were encountered before reaching latitude  $75^{\circ}$  N. The rough and tumble work commenced July 29, when a close barrier of ice was forced by ramming, and the ship got into the coast-water of Novaya Zemlya, in which she worked slowly along, impeded by ice and dense fogs. On August 20, after separating from her consort, the *Isbjörn*, which returned to Europe, the *Tegetthoff*, as chronicled by Lieutenant Payer, "ran into an ice-hole, and in the night barriers of ice stopped our further progress. As usual, the ship was made fast to a floe, the steam blown off, and we awaited the parting asunder of the ice." (The position was then latitude  $76^{\circ} 22'$  N., longitude  $63^{\circ} 3'$  E.) "Ominous were the events of that day, for immediately after we had made fast the *Tegetthoff* to that floe, the ice closed in upon us on all sides, and we became close prisoners within its grasp. No water was to be seen around us, and never again were we destined to see our vessel in the water." Thus the self-agency of the Austro-Hungarian Expedition was paralyzed by the mighty grasp of the ice, and the chances for making valuable discoveries depended on the drift of the pack-ice in which the ship was irrevocably beset. The similarity of this experience to that of the *Jeannette* seven years later is very marked. In both instances, after the ship had just entered the ice-fields and further progress seemed impracticable, they were made fast to the ice and remained quietly awaiting an opening. One axiom in arctic navigation is that a steamer, after being caught in the ice, should keep her engines in motion until after all chance of getting out is gone. A ship tied up to an ice-floe becomes a nucleus about which other floes collect. But if the engines are kept moving, the floes will gradually work away from the center of disturbance to

spaces of least resistance, and sometimes thus afford chances for escape. Vessels in Baffin's Bay and the Greenland Sea may risk forcing ice-barriers to the northward, for the southerly drift almost ensures a speedy liberation.

Instances are known of whale-ships having been beset in the ice for weeks and then liberated in time to make a successful season. The notable cases of the *Tegetthoff*, *Jeannette*, *Vigilant*, *Mount Wollaston*, *Eira*, and *North Star* all show that besetment in the Arctic Ocean north of *Novaya Zemlya* and *Siberia* is sure to be fatal to an expedition.

The position of the *Jeannette* was about 1400 miles east-southeast of that of the *Tegetthoff*, yet the ice conditions and the way in which they were hemmed in by the floes were very similar. "The ship and her rigging were stiff with ice, and everything indicated that for us winter had begun. As the masses of ice that enclosed us consisted of small floes, we were led to hope that the strong east wind would disperse them. But the very contrary really happened, for the low temperatures, the calms, and falls of snow bound the floes together the more closely, and within a few days congealed them together into a single field, in the midst of which the ship remained fast and immovable." During the autumn of 1879 the floes moved in upon the ice which encased the *Jeannette* and became bound together by great sinews of newly formed ice made during the calm weather and comparative inaction of the ocean. The ship was near the center of a large island of ice, the greatest distance across which was more than three miles. This great natural bulwark repelled the encroachments of the contending masses on its borders, which, however, broke into and disrupted the island of ice, and the ship was eventually crushed. Such also would doubtless have been the fate of the *Tegetthoff* had not the surrounding ice, after drifting more than fourteen months at the caprices of the winds and currents, been stranded in the shallow waters south of *Franz Josef Land*, which was thus accidentally discovered. The two winters during which the crew stood by the ship were fraught with great perils and anxieties, and the hard-contested battle for life and return to civilization are among the most interesting in the annals of arctic adventure.

The geographical results of this expedition were important from the discovery of a group of extensive islands north of the eightieth parallel, the extreme northern point of which being *Cape Vienna*, in latitude 83° N. The islands, as described by *Payer*, are very rugged,

and so covered with ice and snow that little soil is visible, the vegetation and animal life being very scanty, owing to the extreme climate. The annual mean for 1873 was only  $+3^{\circ}$  F., the minimum  $-51^{\circ}$  F. occurring in February, 1873, the average for that month being  $-30.9^{\circ}$  F., while July, 1873, was the warmest month, it having a mean of  $+43^{\circ}$  F. The mountains of Franz Josef Land are from 2000 to 3000 feet, and some loftier ones in the southwestern portion are estimated at 5000 feet. They are glacier-bearing lands, and it is inferred by Payer that icebergs are shed which drift to the northward, and are then caught by a southwest current and taken to the Hope Island locality. The observations of the expedition were analyzed by Vice-Admiral Baron von Wüllersdorf-Urbair, who made the following statements, which, however, seem rather indefinite:

1st. "It is probable that there exists a sea-current between Novaya Zemlya and Franz Josef Land; that, at any rate, its existence cannot be denied, although the prevailing winds may produce similar phenomena."

2d. "There is great probability that the ocean stretches to the north and east far beyond the eastern end of Novaya Zemlya."

From what we can gather from the meagre descriptions of the ice south of Franz Josef Land, I judge that it is not so heavy as the ice in the Greenland seas and that encountered north of Spitzbergen by Parry. Yet it is practically unnavigable for ships. There may be exceptional seasons, however, during which a ship might reach Franz Josef Land and establish a base of operations far to the northward. Since the return of the Tegetthoff party, such a route has been regarded with favor by many interested in exploration, from the fact that the most northern known land lay on that route; but since the reports of the Greely Expedition in the summer of 1884, and the news of the discovery of Lockwood Island in latitude  $83^{\circ} 25'$  N. on the Greenland coast, the Smith Sound route has again become the most important.

The wide expanse of ocean between Franz Josef Land and Bennett Island is doubtless covered by drifting ice and dotted here and there with islands. The experience of Leigh Smith in the Eira, which was crushed by the ice, and the failure of Lieutenant Hovgaard to penetrate to the eastward of Novaya Zemlya, both show the impracticability of the route.

Furthermore, the remarkable drift of certain relics of the Jeannette,

which were abandoned in latitude  $77^{\circ} 15'$  N. and longitude  $156^{\circ} 06'$  E., and found about two years later in the vicinity of Cape Farewell, indicates that large masses of land do not exist north of Franz Josef Land, for were such the case, the continuous northwest drift of the ice would not have prevailed. After a careful consideration of all the information about Franz Josef Land and its vicinity, I conclude that it will not afford the best route to the pole, for exploring vessels cannot with any certainty reach its shores successfully.

#### THE EAST GREENLAND APPROACH.

This has always appeared an unpromising route, because of the vast quantity of ice constantly drifting to the southward between Iceland and Greenland, in addition to the heavy masses of field-ice with which the east coast of Greenland is beset, even during the summer. The field-ice evidently comes from the inner polar regions, and the icebergs are from the glaciers of the extensive fiords of the east coast. Of late years there has been only one energetic and well-organized attempt by this route, and it was made in 1869 and 1870 by the Second German Arctic Expedition under the command of Captain Karl Koldewey, with the counsel and co-operation of that eminent geographer, the late Dr. Petermann. The salient feature of the scheme was the penetration of the ice-bearing current in latitude  $75^{\circ}$  N., or higher if possible, and the reaching of the coast-water, when, if found that the land continued to the northward, a vigorous attempt would be made to reach the central polar regions.

With true German enthusiasm, the expedition set out from Bremerhaven in June, 1869. The small steamer *Germania* (143 tons, 90 feet length, 22 feet beam, and 11 feet depth) was equipped as the leading vessel, to carry the commander and scientific staff. The brigantine *Hansa* ( $76\frac{1}{2}$  tons) was chosen as consort and store-ship to accompany the steamer.

Soon after entering the ice in latitude  $75^{\circ}$  N. and longitude  $10^{\circ}$  W. the two vessels became separated by the misinterpretation of signals, and the *Hansa* was beset and drifted at the mercy of the ice. She was crushed, and sank in October. Captain Hegemann and his crew drifted rapidly to the southward in plain view of the coast until the following May, when they abandoned the floe, took to the boats, rounded Cape Farewell, and landed in safety at Friederichstal, June 13, 1870.



The *Germania* being unable to reach a high latitude, wintered at Sabine Island, in latitude  $74^{\circ} 35' N.$ , near the Greenland coast. In the spring of 1870 a sledge-party under Koldewey and Payer reached Cape Bismarck, latitude  $77^{\circ} 01' N.$  and longitude  $18^{\circ} 50' W.$ , which is the highest position yet attained on that coast. The expedition returned to Bremen during the following summer.

The experience of the *Germania* shows that during the summers of 1869-70 it was impracticable to navigate the coast-water of East Greenland to a high latitude; that the sharp capes and promontories of the coast intercept the drift-ice and thus effectually blockade the coast.

The soundings were not numerous, but those within the icy girdle show a moderate depth of ocean. About 60 miles west of Jan Mayen the greatest depth was found (1319 fathoms). The observations of surface temperatures were numerous, and they showed that the water cooled rapidly to nearly  $32^{\circ} F.$  as the vessel approached the outer limits of the ice, and there were only a few instances within the ice when the temperature was a fraction below that point. The climate was not as severe as was expected for latitude  $74^{\circ} 45' N.$ , November being very pleasant, with a daily mean of  $-2^{\circ} F.$ , and even in December the thermometric range was from  $+14^{\circ}$  to  $-4^{\circ} F.$  In January the lowest was  $-26.5^{\circ} F.$ , and on February 21 the minimum was observed at  $-41^{\circ} F.$ , when the mercury commenced to congeal, but the extreme cold lasted only one hour.

The greatest thickness of ice recorded during the winter was fifty-seven inches, on February 16, 1870. An abundance of animal life was found, musk-oxen, bears, foxes, walrus and seal were killed by the party, besides a goodly number of sea-fowl. There were no traces of present inhabitants, but ruins of huts, ancient graves, utensils, ornaments, and implements in stone and ivory were found. The result of this German expedition, combined with other knowledge and reports, demonstrates that the coast-water of East Greenland does not present the same advantages to navigators that are to be found every year on the west coast.

The investigations into the general features, climate and resources of the region have a certain scientific interest, but it seems obvious that the central polar regions will not be reached by this route, unless some remarkable ice conditions, never before known, should make it feasible.



## THE BAFFIN BAY AND SMITH SOUND APPROACH.

The great Atlantic highway to the north lying between Greenland and the American archipelago was first penetrated by that intrepid navigator John Davis, who sailed from England in the year 1585 in the *Sunshine* (50 tons) and the *Moonshine* (35 tons). He discovered the strait which now bears his name, and to the northward he saw a wide expanse of ocean that was subsequently, in 1616, entered by Wm. Baffin, who pushed north with great energy, and on June 9 reached latitude  $74^{\circ} 15' N.$ , though he had only one small craft of 55 tons, called the *Discovery*. He then encountered the "Middle Pack," and, after battling with it for twenty-two days, reached the head of Baffin's Bay, and was the first to enter what has since been called the North Water—the favorite resort of whale-ships since the beginning of this century.

Beyond the North Water are Smith Sound, Kennedy and Robeson Channels extending to the northward, which have been the fields of the most recent and successful polar expeditions. Baffin Bay receives the great masses of ice that drift through Smith Sound from the higher regions to the northward, and when the lower parts of the bay contain much floating ice, the upper parts have great water spaces and are at times practically free from ice. The great barrier to the North Water is what the whalers call the "Middle Pack." It is well described by Mr. Clements R. Markham as follows:

"This ice consists of some ancient floe-pieces of great thickness, which may have come from a distant part of the arctic seas, of a wide extent of ice formed during each winter, about six or eight feet thick, and of those magnificent bergs which compose the principal charm of the Melville Bay scenery." "It is a curious fact that, although there was a flourishing whale-fishery in Davis Strait, the passage of the 'Middle Pack' was never attempted between the years 1616 and 1817." It is also a fact that in England the statements of the discoveries by Baffin were not believed until after they had been corroborated by the expedition of Sir John Ross, which reached the North Water and named the capes at the entrance of Smith Sound after the ships *Alexander* and *Isabella*.

The whale-ships since 1817 have made their most prosperous voyages in that region, for the whales there having for many years enjoyed solitude, their numbers had greatly increased. In August, 1852, during the Franklin search, the steamer *Isabel* rounded Cape Alexander and saw open water to the northward. The entrance to

the sound was found to be thirty-six miles wide. Capt. Inglefield named all the islands and points of land that were in sight, but the celebrated Dr. Kane was the first civilized man who visited the region above the south capes of Smith Sound.

The Second Grinnell Expedition in search of Sir John Franklin consisted of the brig *Advance*, with a crew of seventeen men, under the command of Dr. E. K. Kane. The brig was frozen in on the east coast of Smith Sound, in latitude  $78^{\circ} 37'$  N. and longitude  $70^{\circ} 40'$  W., at a little place called Van Rensselaer Bay. On board the brig and after she was abandoned, whilst the explorers were retreating to the Greenland settlements, Dr. Kane and his party had a thrilling experience.

The discoveries made were very important in showing that a high latitude could be attained, and that there was an abundance of animal life in the waters of the Smith Sound region. The charmingly romantic descriptions of Dr. Kane in his remarkable book awoke lively interest both in Europe and America, and the subject of the "Open Polar Sea" rendered arctic exploration more attractive than ever before. The late Dr. I. I. Hayes, who was surgeon of the Second Grinnell Expedition, organized another and made some important discoveries on the west side of Smith Sound. Again, the United States in 1871 sent an expedition. The *Polaris*, under Captain Hall, had an exceptionally fine season, and on August 30 reached latitude  $82^{\circ} 16'$  N. without serious obstruction by the ice. At that date it was the highest position ever reached by a ship. The *Polaris* was put into winter quarters, and subsequent exploration was made by sledge parties. The sad death of Captain Hall and the tragic adventures of the survivors have made thrilling pages that are familiar to American readers. The geographical discoveries made by the *Polaris* were important and extensive. Interesting facts about the climate, animal and vegetable life were gathered, and many traces of Esquimaux were observed, though none were actually living in the most northerly region at the time. The climate was found to be milder than in some regions further south, and a current setting to the southward was found in Robeson and Kennedy Channels, which were so named by Captain Hall and Dr. Kane.

The energy and success of the American expeditions, together with the promising features of the route, stimulated the spirits and ambitions of the little coterie of former arctic adventurers in London, and the proposition to send a British Expedition was agitated and

met great public favor. After the subject was thoroughly discussed, it was decided to make a splendid effort to reach the North Pole, and some of the best talent of the kingdom was, by the Admiralty, brought to bear in fitting out the *Alert* and *Discovery* for the arduous task. The command was entrusted to Captain G. S. Nares, R. N., whose excellent narrative is one of the best authorities, at present, on the borders of the central polar regions. The summer of 1875 was a very favorable season for reaching Smith Sound, but it required the most patient and skillful navigation to conduct the vessels through the dangerous ice of Kennedy Channel. The *Discovery* was left at Lady Franklin Bay as a relief ship in case of disaster to the advancing *Alert*, which pushed on and had the good fortune to reach a position near Cape Sheridan, in latitude  $82^{\circ} 20' \text{ N.}$ , longitude  $61^{\circ} \text{ W.}$  This locality is well described by Captain Nares (Vol. I., p. 129). "To the north of Robeson Channel, where the land trends to the northwestward, the coast-line loses its steep character, and near Cape Sheridan the heavy polar ice becomes stranded at a distance of 100 or 200 yards from the shore, forming a border of unconnected masses of ice from 20 to upwards of 60 feet in height, lying aground in from 8 to 12 fathoms of water. Off an open coast, with no more protection than that afforded by such pieces of ice, the *Alert* was fated to pass the winter. Most providentially, during the eleven months she was exposed we never once experienced a gale blowing towards the shore."

During the long winter of 1875-76 the party had a very interesting experience, which was enlivened with characteristic English jollity. On May 29, 1876, Captain Nares ascended Mount Julia, about 2000 feet above sea level, and gave the following (Vol. I., p. 326): "The interminable pack appeared from our lofty station to consist of small floes hedged round by broad barriers of rough ice, until in the extreme distance it blended with the horizon; not a pool of water nor the faintest appearance of water-cloud was to be distinguished within the range of our vision, which embraced an arc of  $160^{\circ}$ . We were perfectly satisfied that no land of a great elevation exists within a distance of 80 miles north of Cape Joseph Henry, and none at all within 50 miles, which, from our lookout, bounded the visible horizon.

"We may rest assured, therefore, that from the coast of Grinnell Land, in latitude  $83^{\circ} \text{ N.}$  to the 84th parallel of latitude, there stretches the same formidable pack which was encountered by Markham and

his companions. Whether or not land exists within the 360 miles which stretch from the limit of our view to the northern axis of the globe is, so far as sledge travelling is concerned, immaterial. Sixty miles of such pack as we know to extend north of Cape Joseph Henry is an insuperable obstacle to travelling in that direction with our present appliances; and I unhesitatingly say that it is impracticable to reach the North Pole by the Smith Sound route."

It was very natural for Sir George Nares to form such a judgment from the ice conditions that he saw in 1875 and 1876, but he was doubtless surprised to learn that in 1882 Dr. Pavy, of the Greely Colony, was adrift on the Polar Ocean for one day, and had to abandon almost everything in order to get back to Cape Joseph Henry. Such are the changing conditions of the ice!

The heaped-up, ancient ice that Nares saw in 1876 was navigable for boats only six years later. The journey made by Markham and Parr with an overladen party has never been exceeded in difficulty and hardship. They reached latitude  $83^{\circ} 20' N.$  and longitude  $63^{\circ} W.$ ; found there a depth of 72 fathoms—surface temperature  $28.5^{\circ} F.$  and bottom temperature  $28.8^{\circ} F.$ , with tidal action apparent, setting NW. and SE.

The shallow water in this extreme northern position indicates the probable existence of land in the vicinity. The travelling on the northwest coast of Greenland was very difficult (Vol. I., p. 316). "Dr. Coppinger reports that Beaumont's sledges have experienced greater difficulties and worse travelling than we expected. From their place of crossing the straits they found that the coast-line for the entire distance to Cape Stanton was formed either by very steep snow-slopes or precipitous cliffs, the bases of which receive the direct and unchecked pressure of the northern pack as it drifts from the northwest and strikes against that part of the coast nearly at right angles. The chaos amongst the floebergs near the shore was something indescribable, and the travelling the worst that could possibly be imagined, seven days being occupied in moving forward only twenty miles."

This was the graphic description of the ice conditions north of Greenland in 1876, yet seven years later Lieutenant Lockwood was turned back by the presence of open water in the very same region. Lieutenant Beaumont reached latitude  $82^{\circ} 15' N.$ , longitude  $51^{\circ} W.$ , and named several points further to the northward. In the summer of 1882 Lockwood worked over the same route, attaining  $83^{\circ} 24' N.$

in longitude  $44^{\circ} 30'$  W., where he discovered the island which now bears his name, and from the elevation of 2000 feet could see no land to the north or northwest, but to the northeast he observed land extending as far north as latitude  $83^{\circ} 35'$ , and to the eastward as far as longitude  $40^{\circ}$  W. The extreme point is now called Cape Kane, the nearest discovery yet made to the North Pole.

To the westward of the Alert's winter quarters Lieutenant Aldrich explored the coast of Grinnell Land, his farthest being longitude  $85^{\circ}$  W. and latitude  $82^{\circ} 16'$  N., at which position the land trended to the southwestward. The Nares Expedition added extensive coast-lines to our polar charts and made important observations on the climate, topography, geology, flora, fauna and general ice conditions of the regions visited. The public mind seemed satisfied with the decision proclaimed by Sir George Nares that Smith Sound was not a practicable route for reaching the North Pole.

The good judgment shown by the authorities in sending two ships, the care with which they were fitted out, and the energetic skill of the commander conducting the expedition, all met with merited favor, and the polar question seemed settled in the minds of the English people. The further explorations by Lockwood once more bring the Smith Sound route into prominence. The indications given by the trend of the east and northwest coasts of Greenland as determined respectively by Koldewey and Lockwood point to the probable fact that the converging coast-lines of north Greenland meet in about latitude  $85^{\circ}$  N. The explorations of Greely, Lockwood and Sergeant Brainard into the interior indicate that the territory on the west side of Smith Sound, Kennedy and Robeson Channels consists of large islands with extensive fiords between them, being, in fact, a continuation of the archipelago north of British America, and protecting a "covered way" to the central polar regions. Our information about the other results of the Greely Expedition is very meagre, and the full report of the various observations made at Fort Conger will doubtless be of great interest.

#### THE BERING STRAIT APPROACH.

The nearly land-locked portion of the polar basin bordering Asia and North America has only one outlet for ice, Bering Strait, which is about 50 nautical miles wide, and has an average depth of about 23 fathoms.



The straits and channels between the islands of the American archipelago have been found blocked with heavy ice, but there is a current apparently setting through them to the southeast, as evidenced by the drift of vessels abandoned in Barrow Strait and Lancaster Sound, and also by whales killed in Baffin Bay bearing harpoons belonging to whale-ships on the Bering Strait side, thus indicating sea communication for those great animals. The ice conditions beyond Bering Strait have been found so unfavorable that a real polar expedition never attempted the route before the Jeannette Expedition. It is true that the celebrated Captain Cook entered the strait in 1778 and made some important discoveries on the Asiatic and American shores; that Captain Beechey, with the *Blossom*, examined the American coast in 1826, when acting in concert with Franklin and Parry; that Captains Kellett, Moore and Maguire (1849-52) and Collinson (1851-53) operated in those waters in connection with the Franklin Search Expedition; that Herald Island was discovered by Captain Kellett in *H. M. S. Herald* in 1849, and that he reported extensive land northwest of the island; that in 1855 the late Rear-Admiral John Rodgers, then in command of the *U. S. S. Vincennes*, made a dashing and successful reconnoissance, visited Herald Island, and was within a few miles of the south end of Wrangell Island, which was hidden by the fog. All this work was important, and the reports of the various commanders, supported by those subsequently made by the masters of whale-ships, were to the effect that impassable barriers of ice north of Bering Strait precluded all hope of success for a polar expedition by that route.

The whale-ships cruised along the borders of the heavy ice-fields, and made very profitable voyages. During some seasons the ice would be so open that venturesome captains would enter lanes of water and work to the northward, soon, however, being obliged to return by the movements of the ice. Captain Long, of the barque *Nile*, in 1867 had the temerity to work his vessel far to the westward of the usual whaling grounds, and sighted the south part of the so-called Wrangell Land, named the capes and a mountain, then returned safely. The wide strait between Siberia and Wrangell Island has since been called Long Strait. Captain Silas Bent issued a pamphlet on the subject of the Kuro Siwo or Japanese Black Stream, entering the Arctic by Bering Strait, and exerting a powerful influence by melting the ice. The "Thermometric Gateway" to the pole was much discussed, and it was stated that a vessel by constantly observing the temper-



ature of the surface water could keep in the warm current and thus reach a very high latitude.

There were many indications of northerly currents beyond Bering Strait. Abandoned whale-ships beset in the ice had drifted to the north or northwest. The experience of Hedenström, Anjou, and Wrangell had given a strong impression that there was quite an open sea to the northward, where extensive "polynias" or large patches of open water connected by water lanes would be found to render navigation practicable. In 1878, Dr. Petermann, of Gotha, advanced a theory that Wrangell Land was doubtless an extension of Greenland which reached across the pole and formed an Arctic continent, thus dividing the circumpolar basin into two parts. This theory was doubtless based on the study of the circulation of the waters in that basin, from which it seems that the part adjacent to North America is almost a closed sea. Should the coast of the supposed continent extend to the northward, a very high latitude might be attained by working a ship in the coast-water, thus having land for a basis, and sledge travelling might be resorted to after navigation was stopped. An open season might occur to enable a vigorous dash towards the pole. Great interest was shown in this new and untried route. One old Scotch whaling master remarked to Captain De Long that the English had always taken the "uphill" way to the north, thus having to struggle against the southerly current, but that he (De Long) proposed to take the right way, which was "down hill," being with the current towards the pole.

Of course such a voyage would be more hazardous, the line of retreat would be indefinite, and in case of disaster we could not, in all probability, return the way we went. Such was the state of knowledge when the U. S. Exploring Steamer *Jeannette* entered the ice-fields near Herald Island, on September 5, 1879, and after several feeble, ineffectual efforts, became hopelessly entangled in the ice of the main pack, from "ten to fifteen feet in thickness," as stated in Captain De Long's journal. On the afternoon of September 5 there seemed to be little chance of advancing further, but a very good chance for getting out of the pack. Our commander did not take advantage of it, for the reason, we supposed at the time, that he wished to make a daring and magnificent attempt to reach the North Pole by means of the chief agencies of the Arctic Ocean, the drifting ice and currents. He seemed to have confidence, as at other times he had expressed himself, that the *Jeannette* was strong enough to

resist any ice she should meet. His journal (Vol. I., p. 116) clearly states his object: "September 6, Saturday. This is a glorious country to learn patience in. I am hoping and praying to be able to get the ship into Herald Island to make winter quarters."

This statement is in accordance with remarks made on former occasions by Captain De Long, to the effect that the drifting pack was really the last place in which a ship should be put, for then all command over her movements is given up to the ice. The season of 1879 appeared very unfavorable, though the state of the ice to the eastward of our position in the vicinity of Point Barrow was not known to us. By the courtesy of Mr. George Kennan, in June, 1882, I received a copy of the following statement of Captain Barnes, of the whaling barque *Sea Breeze*, who was the last man to see the *Jeannette* before she entered the ice:

"When we reached longitude  $170^{\circ}40'$  W. we found the ice trending to the NNW., and during the afternoon of September 2 we steered to the NNW. with a fresh SSE. wind. At 9 that evening we saw the topmasts of a vessel to the westward of us heading north. When it became dark we shortened sail and lay aback till light, then kept away to NNW. When it became quite light, at half-past three o'clock, a sail was seen a few miles ahead, and she was soon made out to be a steamer under sail steering about north. The weather, which had been fine, now began to be foggy, with snow, and we found that we were getting into a bight in the ice, with scattering cakes all around, so at 6 A. M. we luffed to the wind under short sail to await clear weather. At that time the steamer was perhaps six miles north of us. Shortly after the fog settled down and shut her in from our sight, but twice during the forenoon it cleared a little and we saw her close-hauled first on one and then on the other tack. In the afternoon it became very thick and remained so for twenty-four hours. During the fogs I worked a little to the westward, over to the pack-ice, and when, on the following day, I headed to the eastward, we soon ran into clear weather and the steamer had gone out of sight. I imagine that he had the clear weather some hours earlier than we did. We last saw the vessel that must have been the *Jeannette* about 11 A. M., September 3, about 50 miles SW. of Herald Island. In a day or two afterwards the other whalers began to arrive from Icy Cape, and some of them crowded up towards the island, then well in sight, as close as possible. Two of them saw what appeared to them to be the smoke of a steamer in towards the island. In a

short time the ice to the east of this open space began to close in upon the western pack, and we whalers had to run 50 miles further south and to the east, where we began to see whales, and so did not get near Herald Island again till near the end of September."

Now let us turn to Captain De Long's journal for September 3, 1879 (Vol. I., p. 113). "At daylight the weather became thick and foggy. Sighted a barque to the southeast under full sail. Had her in sight for three hours, when we lost her in the fog. At her nearest she was four miles distant, and we were too anxious about finding a decent opening in the pack to run down and speak her."

The *Jeannette* was boldly put into the ice and worked up a lead until 3.10 P. M., when the weather was so thick and the ice so closely packed that she was made fast to a floe to await clear weather. "The pack surrounding us seemed to have a uniform thickness of about seven feet, two feet being above water. It is somewhat hummocky, but I do not observe any hummock greater in height than six or seven feet. New ice made around the ship during the night, etc. Sounds as of surf heard to the southeast, indicating open water in that direction."\*

About 4 P. M. on the 4th of September the *Jeannette* was about 40 miles east-southeast (true) from Herald Island, which was in sight, and greatly distorted by refraction. On the 5th she encountered pack-ice "from 10 to 15 feet in thickness," and the following day, September 6th, she struggled in the ice and made a few miles towards the island, so that at the end of this final effort she was doubtless within thirty miles of it, and bearing due east from the center of the island. The weather was so thick that observations and bearings could not be taken.

In this connection the log of the whaling barque *Coral* is very interesting and significant. "September 6, 1879. Fresh breezes from NNE. and NE.; ship under easy sail, working to the northward and eastward in leads of water as yesterday. Herald Island in sight about 30 miles distant. Find a current setting to the northward. Twenty vessels in sight. Heard that Bennett's steamer (the *Jeannette*) was seen by the *Sea Breeze* three or four days ago, steering to the northward." From this statement it appears that twenty-one vessels were in close proximity to the *Jeannette* when she cast her lot with the drifting pack. When the whale-ships returned to San Francisco the news was given out that the *Jeannette* was last

\* De Long's Journal.

seen near Herald Island on September 6, 1879, and her fate was wrapt in mystery until despatches from Siberia about January 1, 1882, announced the presence of survivors at the mouth of the Lena. The salient features of the experience of the Jeannette expedition are doubtless well known to the reader, but I shall briefly draw attention to certain details that have peculiar interest.

"On October 10, 1879, the whale-ships Mount Wollaston, Captain Nye, and Vigilant, Captain Smithers, were last seen by Captain Bauldry, of the Helen Mar, in latitude  $71^{\circ} 50'$  N. and longitude  $173^{\circ} 45'$  W., in a narrow channel of open water. The Helen Mar barely escaped being frozen in by crowding on sail and forcing her way through the rapidly forming new ice. In all probability the two vessels which did not escape were frozen in then and there and never got out of the pack."\*

From a careful study of the Jeannette's drift from September 6 till October 10, taken from the journal of Captain De Long, I find that she was very near the position accredited to the Helen Mar on October 10, and was therefore in the vicinity of the two whale-ships beset in the ice. The range of view from the "crow's-nest" of the Jeannette was twelve miles for an object situated on the horizon. There is definite evidence that the two whale-ships never got free from the ice and that their crews perished. "In November, 1880, one of the whale-ships came ashore on the northern coast of Siberia near Cape North (Svernoi-stove), and was prevented from sinking by the ice which still encircled her. Her crew had disappeared except the few who lay where they had perished, and it is probable that the wreck was that of the Vigilant. Another wreck was reported to have come ashore further west on the same coast, but the report does not seem to have been definitely confirmed."

Prof. Dall says: "We do not know, of course, what had been the wanderings of the hulk before she had stranded, but the resultant of her drift for one year was about 200 miles in a SW. (true) direction. This is in the direction of the prevalent winds (NE.) in this region, which, as has been previously pointed out, govern the motion of the ice much more than the currents; but it is also evident that no such overmastering current as has been claimed for this region could have been experienced by this vessel." The above was written before the experience of the Jeannette was fully known. From it and some other considerations it seems most probable that the two whale-ships

\* From the work of Prof. W. H. Dall on the Currents of Bering Sea.

did not drift to the SW. nor pass between Herald and Wrangell Islands, which are only thirty miles apart. If such had been the case it is more than likely that those islands would have been visited, records deposited, and signals erected to attract the attention of whalers, who frequent the vicinity and occasionally visit Herald Island. In the two seasons following both islands were visited by the Corwin and the Rodgers, and no traces were found.

As the whale-ships were in the vicinity of the Jeannette on October 10, 1879, when all three were drifting with the ice, it is very probable that all had similar experiences during the first six months. The Jeannette drifted back and forth over the 180° meridian in a locality north of Wrangell Island, where currents seemed to meet, and not until more than a year of such erratic movements did she take up a continuous drift to the northwest. Doubtless the whale-ships were involved in the same conflicting currents, and a few miles difference in position from the Jeannette might have given the mastery to the SW. current, or the ships might have been carried beyond Wrangell Island and then to the SE., reaching the vicinity of Cape North in a little more than one year. The information given by the natives and the marking on the harpoons show conclusively that the wreck seen off the Siberian coast was that of the Vigilant.

Let us return to the fortunes of the Jeannette and see how widely they differed from those of the whale-ships beset in the same locality. After making many gyrations and erratic movements north of Herald and Wrangell Islands in the variable currents, the Jeannette finally crossed the 180th meridian to the westward and took up a continuous drift to the northwestward. She had made a zig-zag course for nearly sixteen months, often doubling on her track, and had traversed about 1300 miles, though making good a resultant of only 220 miles to the northwest of the place where she was imprisoned. The outlook for 1881 seemed more encouraging, for the water was deepening and the drift becoming more uniform in one direction, while the jarring of the ship and the portentous ice movements almost ceased until spring came.

The journal for January, 1881, shows that the prevailing winds were between S. by E. and E. (true), and that it was the most windy month up to that time. The drift for the month was 99 miles NW. by W., which, combined with the increase of soundings, made us hope that we were in the influence of a definite current and would no longer be subjected to the tantalizing delays caused by conflicting



currents and ice blockades in shallow waters. Occasionally the ship's course would be deflected to the NE., and the water deepening very rapidly, would revive Captain De Long's hopes for reaching Atlantic waters by way of Smith Sound or to the eastward of Greenland.

February 28, 1881, he writes that he still hopes to be pushed to the NE. by the outflow of the great Siberian rivers.

March 21, 1881. "Soundings in 68 fathoms and an indicated slight drift to NW. Every time we go NE. we deepen our water, and shoal it again when we go NW." From March 16 to April 13 the soundings increased from 60 to  $85\frac{1}{2}$  fathoms, and then commenced to decrease—the drift during the 28 days being 54 miles N.,  $28^{\circ}$  W. On April 21 the soundings showed 81 fathoms, and on the 25th only 35 fathoms, which was due to a strong east gale.

The greatest drift was recorded April 25, 1881, forty-seven miles to the WNW. in four days. The resultant drift of the Jeannette during the last five and a half months that she was afloat amounted to 400 miles N.,  $60^{\circ}$  W., or an average of  $2\frac{1}{2}$  miles per day.

I shall not detain the reader with the details of that terrible experience, drifting in the pack for twenty-one wearisome months, nor of the remarkable struggle for life during the retreat from the crushed and sunken ship to the distant and inhospitable Lena Delta. It was a prolonged and emphasized repetition of history.

The similarity of our experience to that of the Tegetthoff is very striking, though ours was greatly intensified by the tragic events of the Lena Delta. The eloquent words of Lieutenant Payer might have been as aptly used by us: "Happy it is for men that inextinguishable hope enables them to endure all the vicissitudes of fate which are to test their powers of endurance, and that they can never see as at a glance the long series of disappointments in store for them. We must have been filled with despair had we known that evening that we were henceforth doomed to obey the caprices of the ice; that the ship would never float again on the waters of the sea; that all the expectations with which our friends but a few hours before saw the Tegetthoff steam away to the north were now crushed; that we were, in fact, no longer discoverers, but passengers against our will in the ice. From day to day we hoped for the hour of our deliverance. At first we expected it hourly, then daily; then from week to week; then at the seasons of the year and changes of the weather; then in the chances of new years! But that hour never came: yet the light of hope, which supports man in all his sufferings



and raises him above them all, never forsook us amid all the depressing influence of expectation cherished only to be disappointed."

The results of the *Jeannette* experience demonstrate that the route to the NW. of Bering Strait is not a feasible one for reaching the central polar regions with a ship; that the so-called Wrangell Land is really insular in character; that in the region traversed there is no warm current setting to the NE.; that the resultant of the contending currents north of Wrangell Island was to the NW. during the winter of 1880-81; that such current was doubtless caused by the prevailing winds; that the ocean north of Siberia is very shallow and does not "teem with animal life," as some theorists have stated; that the depth of the ocean increases gradually to the NW. and rapidly to the NE. of the ship's track, and that the climate in the region explored was not as severe as that of some parts of Siberia, but the cold was greater during the second winter than during the first, when the ship was not quite so far north.

Valuable meteorological observations were made, but from which no important deductions can be drawn, owing to their limited scope and the constant change of the observer's position. The discovery of the De Long Islands, three in number, to the north and NE. of New Siberia, is not of great importance, they being of no commercial value, and not promising even as a base of operations for future expeditions.

The remarkable retreat of the shipwrecked crew, dragging boats and sledges over several hundred miles of rugged pack-ice, then working alternately over the ice or through the intervening water-spaces, then, in the face of an arctic gale, embarking in overladen boats to cross nearly one hundred miles of coast-water to reach the Lena Delta, all unite to form a notable example of energy, endurance and heroism that commands the admiration of the world. The administration of discipline and the employment of sanitary measures during those two weary years of isolation were crowned with the greatest success, and the tragic fate of Captain De Long and his immediate party was met with heroic fortitude and ennobling devotion, the remarkable record of which, written with dying hands, brought tears of sympathy to the eyes of the world.

Among the incidental results of the expedition should be mentioned the good work of the revenue cutter *Corwin*, Captain Hooper, which made two summer cruises in the vicinity of Bering Strait, during which she visited Wrangell and Herald Islands, and obtained also

from the natives on the Siberian coast intelligence about the whale-ship stranded at Cape North. The brilliant cruise of United States relief steamer *Rodgers* in the summer of 1881, Lieutenant R. M. Berry, U. S. Navy, commanding, during which he surveyed Wrangell Island, and demonstrated the fallacy of former theories, searched Herald Island for records of the *Jeannette*, and penetrated the ice to the north and west with great skill and dash, finally extricating his vessel as the season ended, and going to St. Lawrence Bay for winter quarters; then, after the misfortune of losing the *Rodgers* by fire, he did not give up the main object of his mission, but, with a sledge-party, pushed westward on the Siberian coast to search for tidings of the missing vessel and to render all the assistance in his power.

The work of the U. S. steamer *Alliance*, Commander George H. Wadleigh, U. S. Navy, is worthy of the thanks and admiration of the *Jeannette* survivors. With an unprotected vessel, and with a crew in excess of the usual complement, Captain Wadleigh went beyond the 80th parallel, and encountered the heavy polar ice northwest of Spitzbergen. In my opinion the voyage of the *Alliance* was the most hazardous search expedition since the days of Dr. Kane. The journey of the survivors of the *Jeannette* through Siberia, and the search-parties of Chief Engineer Melville and of Lieutenants Harber and Scheutze for the gallant and lamented Chipp, who, with his seven companions, were doubtless lost in the gale of September 12, 1881, has attracted the attention of the world, causing the dissemination of much knowledge relating to Siberia and its inhabitants.

#### THE POLAR ICE.

In the Arctic Ocean the navigator encounters ice of two kinds—the icebergs, which are fragments of glaciers, and the ice-fields, which are formed on the sea. Icebergs are met with chiefly in the vicinity of Greenland, and while drifting south to the neighborhood of the Newfoundland Banks. There are glaciers on Spitzbergen and Franz Josef Land which are comparatively small, and the waters contiguous to those lands are not of sufficient depth to float off immense icebergs.

The suggestion has been made that the glaciers of Franz Josef Land probably shed icebergs which float to the northward, and are then brought south by the great polar current; but there seems to be no good evidence to sustain the theory. The iceberg, like the parent glacier, is fresh-water ice, and it floats with almost three-quarters of its

volume beneath the surface. The mighty glacier is moved forward by the force of gravitation, and pushes its base into the sea, which, being of greater density, exerts a lifting power, and soon breaks off an immense fragment, or berg, with a tremendous crash. Floating away to the southward, subjected to the sun's heat and to the action of warm ocean currents, the berg rapidly melts and breaks into small pieces by the changes of volume caused by varying temperatures. The sea-water in the vicinity of the dissolving berg becomes less salt. Icebergs have been seen as far south as latitude  $40^{\circ}$  N., but the proportion of such ice in the arctic regions is quite small, and beyond the 80th parallel bergs are not seen, though occasionally fragments of fresh-water ice are met with.

By far the greatest part of the ice in the northern region is sea-ice, which is salty, and is known by various technical terms, such as "young," "old," "new," "pack," "drift," "hummocky," "posh," "floe-ice" and "floe-bergs." During nine months of the arctic year the process of freezing goes on, and the amount of sea-ice increases; but it is obvious that during the three summer months the quantity that is melted by insolation and by the warm ocean currents, together with that drawn off by the cold currents, must equal the average yearly accumulation, otherwise the polar basin would in course of time become filled up with great masses of ice. The growth of sea-ice by direct freezing is less than eight feet during one year, as shown by the observations and measurements of recent expeditions, and it is probable that further north towards the pole there is little increase, if any, in the thickness. Captain De Long remarked (Vol. II., p. 508): "January 31, 1881. Ice found by actual measurement to be five feet four inches by direct freezing since August 31, 1880, and a gain of ten inches during the past month. As all our measurements are made in a protected place, no increase of thickness is due to snow-drift freezing on the surface. We get the actual growth, and, naturally, all increase is on the lower side. It is worthy of note that the upper half is much harder. It is with great difficulty that the auger is got down, the ice offering as great resistance as plate-glass or rock, and pieces broken off by the auger-threads being as firm as flint. Through the lower half the boring is much easier, the ice seeming to be softer and more yielding." The maximum thickness was recorded (Vol. II., p. 540): "April 30, 1881. Ice found to be seven feet six inches (90 inches) in thickness, direct freezing since August 31, 1880." The English Expedition was more than 350

miles further north, and Sir Geo. Nares recorded, "May 4, 1876. To-day the ice was  $79\frac{1}{4}$  inches thick. This proved to be the maximum thickness it attained throughout the season."

At Markham's highest latitude,  $83^{\circ} 20'$  N., the "young ice," through which a sounding hole was cut, had a thickness of 64 inches. The mean temperature at the English winter quarters for February, 1876, was  $-38^{\circ}$  F., and the minimum temperature was recorded March 4 at  $-73.75^{\circ}$  F. The second winter on board the *Jeannette* was a trifle less cold than the above, but the ice formed to a greater thickness—one foot in excess. This was probably due to the cold current in which the *Jeannette* was drifting; and the ocean in the vicinity of the *Alert's* winter quarters doubtless maintained a higher temperature during the winter. The greatest thickness of ice formed in Mussel Bay (latitude  $80^{\circ}$  N.), Spitzbergen, during the winter of 1872-73 was between 6 and 7 feet, as stated by the Swedish Expedition, but in the ocean beyond much heavier ice was met with.

Let us examine some of the most trustworthy descriptions of the ice, and endeavor to get a true conception of its magnitude. Captain Nares (pages 78 and 79, Vol. I.) says:

"The pack, fortunately for us, consisted generally of ice from 4 to 6 feet in thickness, yet there were many heavier floes which must have been from 12 to 20 feet thick; the surface of these consisted of a series of mottled ice-knolls of a blue color and melted-down remains of former hummocks denoting great age. Previous to our departure from England, although ice of similar description had been met with, it was popularly supposed that it had been formed in protected bays which seldom cleared out. One arctic authority asked me to place it beyond all doubt whether it were possible for salt-water ice to attain a mean thickness of more than seven feet; and Dr. Hayes, one of the latest explorers of undoubted authority, was of opinion that ice soon reaches its maximum thickness by direct freezing; that he had never seen an ice-table formed by direct freezing that exceeded 18 feet in thickness. Now that we know the ice in the polar sea is upwards of 80 and 100 feet thick, it may be as well to draw attention to the reports of other navigators on this subject.

"Scoresby describes the ice met with in the Spitzbergen seas as consisting of a single sheet having its surface raised from four to six feet above the level of the water, and its base depressed to a depth of 10 to 20 feet beneath, thus making it 26 feet in thickness.

"Sir Edward Parry, in 1820, when he advanced to the westward of

Cape Hay in Melville Island, and was, in fact, at the entrance of the Polar Sea, remarked with astonishment the thickness of a piece of the regular floe, which, when measured by Captain Beechey, was found to be fifty-two feet." Captain Nares described the ice he saw off Cape Desolation (Vol. I., p. 9, *Voyage to the Polar Sea*). "The pack consists of very old floe-ice floating frequently from eight to ten and occasionally twelve feet above the water, leaving long tongue-pieces projecting below the surface, which form a very large base; thus this ice floating high out of the water has probably one-quarter of its thickness exposed. This estimate would make it from 30 to 40 feet in total thickness.

"We are now able to clear up all doubt respecting the birth-place, age and thickness of this ice. It is the last remains of the heavy floes formed originally in the Polar Sea, which attain upwards of 100 feet in thickness. These drifting south through the main outlet between Greenland and Spitzbergen are carried by the current along the East Greenland coast around Cape Farewell; gradually melting as they reach the warm Atlantic waters of Davis Strait, the ice has all decayed before reaching the Godhaab Fiord in latitude 64° N."

Such heavy ice is not, however, found in Baffin Bay (Vol. I., p. 37). Captain Nares describes the "middle ice," July 22, 1876: "The pack consisted of open sailing ice from one to three and occasionally four feet in thickness."

Captain Parry, describing the ice north of Spitzbergen as it appeared from an eminence, May 22, 1827, remarked: "The nature of the ice was, beyond all comparison, the most unfavorable for our purpose that I remember ever to have seen. It consisted only of loose pieces, scarcely any of them 15 or 20 yards square; and when so large ones did occur, their margins were surrounded by smaller ones thrown up by the recent pressures into ten thousand various shapes, and presenting high and angular masses at every other step. The men compared it with a stonemason's yard, which, except that the stones were ten times their usual dimensions, it indeed resembled very much."

On July 21, 1827, Parry wrote: "The ice over which we had travelled was by far the largest and heaviest we met during the whole journey; this, indeed, was the only occasion on which we saw anything answering in the slightest degree to descriptions given of the main ice. The largest floe was from  $2\frac{1}{2}$  to 3 miles square, and in some places the thickness of the ice was from 15 to 20 feet." Parry also mentions



a great deal of loose ice, some of which was very much water-worn and disintegrated by heavy rains. His descriptions seem to be very fair and not exaggerated, at the same time being more definite than those of most writers. Nordenskiöld states, August 30, 1872, latitude  $80^{\circ} 05' N.$ : "The edge of the ice was met with and its nature was found to be such as to extinguish all hopes of reaching the Seven Islands. The ice formed a continuous sheet of considerable thickness, which appeared likely to stand many a storm before it would be broken up and dispersed. On October 22 Palander visited four walrus-hunters that were frozen in near Grey Hook, lying close together near the beach with a close broad belt of blocks of ice five or six fathoms high thrown up on a shallow; beyond this the ice was of inconsiderable dimensions."

The ice encountered by the *Jeannette* was not as heavy as that described by Captain Nares in the northern part of Smith Sound, nor as that stated by some authors to have been met with on the east coast of Greenland. Captain De Long called the main pack "10 to 15 feet in thickness" (Vol I., p. 115).

In some places the ice was piled up in ridges; great slabs and blocks were seen, measuring 25 feet. (Page 614, Vol. II.) Captain De Long remarked: "This very old and hard ice is beyond doubt what Sir George Nares calls 'paleocrystic.' I measured one place and found it 32 feet 9 inches in thickness, and, where it is not mud-stained, it is rounded up in hummocks resembling alabaster. Over this we sledged and dragged well enough, though it was, as the men said, 'a rocky road to Dublin.' I encountered one piece which was 16 feet thick, and I am almost inclined to believe that it was a single growth, for not a line of union of layers could be seen."

From statements made by whalers and others I had received an exaggerated impression of the appearance of the great ice-barrier north of Bering Strait, but I soon learned that it would be difficult, and doubtless impossible, to gain a full conception of its mighty power when in motion. A few inches of ice on the Potomac has during a spring "break up" carried everything before it. Imagine what must be the force exerted by hundreds of square miles of pack-ice, averaging eight feet in thickness, driven before a strong gale, the hummocks, ridges and irregularities of surface receiving the pressure of the wind.

Viewed from aloft the ice-fields have a rugged appearance, great ridges having been tossed up by the contending masses, huge slabs turned on their sides, and bluff hummocks showing in all directions.



If, however, we could refer ordinates of all the irregularities above and below the water to a common axis, the water-level, we should doubtless find the average thickness of the entire pack to be about eight feet, and floating with six feet immersed and two exposed above the water.

Some very heavy ice has been reported northeast of Herald Island, and north of Grinnell Land, along the coast, it is unquestionably heavier than any seen by the Jeannette party, but in my judgment the ice encountered by Parry north of Spitzbergen, by Weyprecht and Payer in the Novaya Zemlya seas, and by Koldewey off the east coast of Greenland, is very similar to that observed by our party north of Siberia.

How to account for the great thickness of some of the ice is a difficult problem. During the winter quantities of snow fall, and before the middle of July the snow is melted, forming large lakes of brackish water on the ice-fields or running off into the sea, rendering it less salty. In summer the ice melts very slowly, and, generally speaking, the thickness of the fields is not decreased more than three feet. Winter comes, and the sea-ice again reaches its maximum of seven to eight feet and takes on its new burden of snow. There is no good reason for believing that within the central polar regions the ice forms to a much greater thickness from direct freezing than on the borders reached by explorers. The probable annual mean temperature at the North Pole has been computed by Dove to be  $+2.3^{\circ}$  F., which is higher than the annual means observed at Ust-Jansk-Siberia ( $+2.7^{\circ}$ ), Mercy Bay ( $-0.2^{\circ}$  F.), Rensselaer Harbor ( $-3.1^{\circ}$  F.). H. M. S. Alert, near Cape Sheridan, winter of 1875-76, mean of 366 days ( $-3.473^{\circ}$  F.) H. M. S. Discovery, at Lady Franklin Bay, mean for 1875-76 ( $-4.232^{\circ}$  F.) The Alert, though nearly one degree of latitude further north, had a higher annual mean. The year 1873, at the Tegetthoff's position, near Franz Josef Land, had a mean of  $+3^{\circ}$  F., and the minimum was only  $-51^{\circ}$  F. Hence we cannot attribute the origin of the heavy ice to direct freezing in regions colder than any yet visited, and must therefore look to other physical causes.

Scoresby (p. 285) says: "The closing of heavy ice encircling bay-ice causes it to run together with such force that it overlaps wherever two sheets meet, until it sometimes attains a thickness of many feet." The same author speaks in his books of having seen heavy masses overlapping one another. Payer mentions (p. 148): "By the end

of January all the open places of the sea were closed, and the masses of ice were thus driven the one upon the other from their mutual pressure, and pile rose upon pile." During the Jeannette experience the conflicts on the borders of the extensive ice-fields were often witnessed when immense pieces of broken ice were forced up into ridges, and in some cases overlapping of fields took place.

Sir George Nares (p. 58, Vol. II.) says: "As before mentioned, a polar floe only one year old is composed, not of ordinary ice frozen on the surface of a space of water, but of a quantity of conglomerate ice pressed together by the general movement of the pack, and then frozen into a floe ten or twelve feet and upwards in thickness." Dr. Moss, of the English Expedition, *seemed* to be of the opinion that the growth of the polar ice depended on the annual snow fall, as evidenced by the stratification of the "floebergs" he examined in the vicinity of the Alert's winter quarters. The heaviest and most extensive floes the Jeannette party encountered on the retreat from the place where the ship sank were in some parts 15 to 30 feet in thickness, and were of the hardest greenish-blue colored ice, without any signs of having been formed from melted snow, and showing no lines of stratification. The snow on their surfaces had all melted, and the flint-like ice that had been exposed to winter temperatures below  $-60^{\circ}$  F. effectually resisted the melting power of the sun's rays. In some cases the hard, fine-grained ice reminded me of the syenitic granite I have seen at the Cairo Museum.

The presence of such extensive floes, showing great age and probable formation in distant localities, was the exception in our experience, and the general character of most of the ice we passed over indicated that we were in its native latitude. I am of the opinion that great masses of ice are formed in the vicinity of Grinnell Land and the islands of the American Arctic archipelago, where the shoving up of floe upon floe takes place by the thrust of the main pack bearing down into the almost closed and inactive part of the arctic basin. The massive accumulations of stranded ice in that region doubtless remain for many seasons unmoved by tidal action and the sea-currents, their proportions and age in some cases appearing so great that it is not surprising Captain Nares called them "paleocrystic floes," though, as defined by Webster, the term means "pertaining to or derived from a former glacial formation," and there is really no evidence pointing to such an origin for the ice described by Nares and Markham. It appears from the reports of the Greely

Expedition that Dr. Pavy's party was adrift off Capé Joseph Henry where Markham encountered ancient and formidable ice-floes. This fact indicates that during some seasons the tides and currents gain a mastery over the stranded floebergs and carry them away to other parts of the polar basin, thus relieving the overburdened parts where the oceanic circulation is less active.

Sea-water, when cooling down gradually, contracts until the temperature of greatest density, about  $39^{\circ}$  F., is passed, and then it expands to the freezing point, after which the ice obeys the general laws of expansion and contraction for solid bodies. We frequently observed that in temperatures like  $-30^{\circ}$  or  $-40^{\circ}$  F. the ice in the vicinity of the Jeannette would be rent asunder by contraction. In some cases the ice seemed to shrink away from the body of the vessel, and cracks in the floe radiated from her as a centre. Such cracks would immediately fill up with water, which would soon become solid ice. A rise in temperature occurring would cause an expansion, which would be relieved in places of least resistance and sometimes cause overriding and piling up of the ice. Professor Nordenskiöld observed the same phenomena north of Spitzbergen.

From the foregoing ice descriptions it may be readily observed that the experience of all the recent expeditions that have reached the borders of the central polar basin demonstrates fully the impracticability of any ship, whatever be its model or however fortified, coping with the ponderous and ever-moving ice-floes of those regions.

#### CURRENTS AND TIDES OF THE ARCTIC OCEAN.

Apart from the numerous theories about the circulation in the circumpolar basin, let us look at the facts derived from actual observation, and at the indications annually given by drifting ice, driftwood and various articles that have been picked up by navigators. From the configuration of the basin it is evident that the widest outlet is between Spitzbergen and Greenland, and observations of the past two hundred years show that the greatest efflux of cold water and drift-ice takes place there. Another cold stream pours out of Barents Sea between Spitzbergen and the north cape of Europe, bearing immense quantities of field-ice and a few bergs; flowing to the SW. it unites with the main stream pouring down the east coast of Greenland. A cold stream flowing down the west side of Smith Sound and Baffin Bay, increased also by the southeasterly current

from the American archipelago, brings large floes and bergs to the south. All three cold streams combine into the great Labrador current which carries the ice to the Newfoundland Banks, and sometimes as far south as latitude  $40^{\circ}$ , where it meets with destruction. We have direct and unmistakable evidence of the outflowing currents of the polar basin, and it is evident that the inflowing currents must return an equal quantity of water. The Gulf Stream, in its course to the northeastward, after washing the coast of Norway, divides into two branches, one continuing to the northeast towards Novaya Zemlya and the other washing the west coast of Spitzbergen. This separation is caused by the meeting with the cold stream coming from Barents Sea, which, by its variable volume, causes great fluctuations in the strength and effect of the warm stream on reaching higher latitudes. When the cold stream is in the ascendancy the warm stream is cooled down to  $39^{\circ}$  F., and then, by its greater density, sinks below the former, reappearing, however, on the west coast of Spitzbergen.

The Gulf Stream is also felt on the west coast of Novaya Zemlya, while the east coast of that island is extremely cold from the ice of the Kara Sea, brought there by a branch of the cold stream. How far east of Novaya Zemlya the influence of the Gulf Stream is felt is not accurately known, though some writers claim that it reaches the vicinity of Chelyuskin, the north cape of Asia. There is also a branch of the warm stream that proceeds up the west coast of Greenland. Other proofs of the work of the Gulf Stream besides sea temperatures are not wanting. The mild climates of the places within its influence, the West Indian beans and timber, the Loffoten floats, oars, etc., that are found north of Spitzbergen, and the immense quantity of animal food it transports to the northern seas, are all definite indications of its presence. The extensive range of the cold currents is indicated by the Siberian and North American drift-wood that they carry and heap upon the coasts that are subjected to their blighting influence. The shores of the Seven Islands and of Spitzbergen are striking instances.

Many theorists have supposed a warm current entering Bering Strait and sweeping right across the polar basin to the main outlet, which is almost diametrically opposite the strait. The proposition of an "Open Polar Sea" received much support from this theory. The work and observations of Professor Wm. H. Dall show conclusively that there is no such important current. He says: "The Kuro Siwo



(sometimes called the Japanese Black Stream) compared with the Gulf Stream, is cooler, has a much smaller volume, and is subject to serious fluctuations which appear to be due to the monsoons. The Kuro Siwo sends no recognizable branch northward between the Aleutians and Kamchatka, nor from any other direction into Bering Sea. No warm current from Bering Sea enters Bering Strait, with the exception of water from the neighboring rivers or the adjacent sounds. This water owes its heat to the direct action of the sun's rays. The strait is incapable of carrying a current of warm water of sufficient magnitude to have any marked effect on the condition of the polar basin just north of it."

"The average depth of the strait near the line of our section, about the narrowest part (49.33 nautical miles), except that line passing through the Diomedes, is  $23\frac{1}{2}$  fathoms. The highest rate observed while at anchor by our party was 1 foot per second for the current. The highest temperature observed was  $48^{\circ}$  F., as will appear by a glance at the section. These figures allow nothing for the space obstructed by the Diomedes, or occupied by the stationary ice on the Asiatic side. The area of the section thus taken, reduced to a rectangle, is 42,289,425 English square feet, and the rate being taken as 1 foot per second, this number represents the number of cubic feet of water which can pass into the Arctic Ocean through the strait at any one second of time. The amount per day is therefore 3,653,806,320,000 cubic feet, assuming the flow to be constant and in that single direction. The basin of the Arctic immediately north of the strait between Asia, America, and Wrangell Island occupies an area considerably exceeding 150,000 square geographical miles, with a depth averaging rather less than 28 fathoms so far as the data go. This contains 931,553 billions of cubic feet of water and ice, which, at the opening of the season, is doubtless at a lower temperature than  $32^{\circ}$  F. Assuming that half of it consists of ice at  $32^{\circ}$  F., which is a liberal estimate, we have about 466 trillions of cubic feet of ice. If the basin were empty, it would take eight and a half months to fill it by the flow through the strait. The period of unobstructed flow of water through the strait does not usually exceed ninety days, and when it does, the excess is at seasons when the water is cold. . . .

"The currents through the strait are chiefly tidal, but with a preponderating tendency northward, as before fully set forth. The currents in the Arctic north of the straits are largely due to the winds, but have tendencies in certain recognized directions. Nothing in our

knowledge of them offers any hope of an easier passage toward the pole, or, in general, northward through their agency. Nothing yet revealed in the investigation of the subject tends to support the widely spread but unphilosophical notion that in any part of the polar sea we may look for large areas free from ice." The work of Prof. Dall is the best evidence that we have on the currents of Bering Strait, and his opinion about the currents north of the strait is sustained by the experience of the *Jeannette* and that of many whale-ships.

The subject of tidal action in the polar basin is one of great interest, and from the limited observations already made, an important inference has been drawn. Dr. Bessels, of the *Polaris*, first noted the meeting of the tides off Cape Frazer in Smith Sound, and the same phenomenon was recorded by the English Expedition. [See Appendix, pp. 356-7, of Nares' Voyage to the Polar Sea.] "The tidal observations made during the expedition were of great value, and confirm the opinion formed on other grounds that Greenland is an island. . . . The expedition proceeding northward up Smith Sound met the tide coming from the north at or near Cape Frazer, latitude  $79^{\circ} 40' N.$ , and left behind the tides of Baffin Bay. The new tidal wave is specifically distinct from the Baffin Bay tide and from the tide that enters the Arctic Ocean through Bering Strait; and it is without question a tide that has passed from the Atlantic Ocean around Greenland northwards and westwards."

At Markham's highest on the polar ocean he observed: "Tidal action was apparent: probable set NW. and SE." North of Herald and Wrangell Islands the *Jeannette* Expedition observed tidal action, and particularly at "full and change" the movements of the ice were more general and violent. At Bennett Island the "rise and fall" was about three feet, and on the west coast of Spitzbergen it was observed by Baffin, Scoresby, and others to be about six feet. The general movement of the circumpolar ice, when viewed from its periphery, seems to be from right to left, and the apparent cause for this great swirl is the combined action of the winds, currents and tides, some authorities believing that the winds have the principal effect. This turning movement is in a direction contrary to that of the earth's rotation. The inflowing and outflowing currents, however, have respectively NE. and SW. tendencies imposed upon them by the diurnal motion of the earth. This general movement of ice is towards the widest and deepest outlet west of Spitzbergen and the channels north of



Smith Sound, which, trending as they do to the SW., greatly assist the main outlet, being separated from it only by what appears to be the northern peninsula of Greenland. The seeming exception to the general statement of the SW. tendency of the ice-bearing currents is the SE. drift from the American Arctic archipelago into Baffin Bay, which may be due to the peculiar configuration of the polar basin NE. of Bering Strait.

Had the *Jeannette* continued her drift in the ice, it seems highly probable that she would have eventually reached Atlantic waters after traversing the region between Franz Josef Land and the pole. The theory of Dr. Mühry, of a current through the central polar regions, is in a measure supported by the probable drift of certain abandoned articles that were left on the ice after the *Jeannette* was crushed and sunk. These relics were found in the vicinity of Cape Farewell about two years after they had been abandoned in a position about 3000 miles to the northward and beyond the pole: thus indicating a mean drift of about four miles per day during that time. There seems now to be no doubt that the relics were found. "At a meeting of the Geographical Society of Copenhagen, December 1, there were exhibited several papers and documents with De Long's signature attached, which, with other relics of the *Jeannette* crew, such as wraps, buttons, etc., were found off the Greenland coast in July, 1884. The first report of this extraordinary find was discredited, but the relics were produced and the veracity of the report maintained." (From the *School Herald*, December 15, 1884.)

Before the *Jeannette* sank there were quantities of provisions and stores deposited on the ice in the vicinity, much greater than it was expedient to attempt to carry during the march over the ice. Careful selections were made and the rejected materials were thrown upon a heap of odds and ends and thus abandoned. It is stated that a charter-party and an old check-book were found. There was a charter made with the schooner *Fanny H. Hyde* to carry supplies to St. Lawrence Bay, and Captain De Long had a check-book on one of the San Francisco banks. Both documents, together with many other useless papers, were doubtless thrown with the things abandoned. This remarkable drift, together with other well-authenticated ones, is suggestive of the idea that nature supplies a conveyance to the innermost regions of the polar basin that is superior to any vessel that can be devised by man.

## GENERALLY RECEIVED FACTS AND INFERENCES.

The arctic basin is the central part of the principal land masses of the globe, while that of the antarctic seems to be in the middle of the great bodies of water. As the former is much nearer the chief centres of population, it is very natural that the mind is more interested in what is to be found beyond the arctic circle than in what the south frigid zone contains. Hence the greater frequency of north polar expeditions. The antarctic ice is also much more formidable and the climate more rigorous. In the vicinity of the South Pole great masses of glacier-bearing lands are supposed to exist, and from them come the immense icebergs of that region. Deep waters contiguous to the high lands readily float away the gigantic bergs to encumber the Antarctic Ocean.

The lands within the north frigid zone are mountainous, but, as far as known, they are not very lofty, the highest peak being that of the volcano Beerenberg on Jan Mayen, in latitude a little north of  $70^{\circ}$ , while on the borders of the polar ocean beyond the 80th parallel the mountains of Grinnell and Franz Josef Lands are not over 5000 feet.

The greatest depth in the Arctic was found by the Swedish Expedition of 1868 in latitude  $78^{\circ} 30'$  N., and almost midway between Greenland and Spitzbergen, at 2670 fathoms, with bottom specimens brought up, while beyond the 80th parallel the greatest depth yet found was by the same expedition at 1370 fathoms. As these soundings were taken in the widest and deepest outlet of the polar basin, they are far greater than the average depth.

The great plains of Siberia seem to extend north as a very even bed for a shallow ocean, such being shown by the observations of the Jeannette Expedition, and also by those in the vicinity of Franz Josef Land. The soundings on the north coast of Grinnell Land indicate an exception to the general rule that deep water is contiguous to high land. The average depth of the Atlantic, Pacific, and Indian Oceans being estimated at 2000 fathoms (2 nautical miles), the polar basin is comparatively a very shallow sea, with an average depth of probably less than 300 fathoms in the parts already traversed by explorers.

From the fact that large icebergs do not come from the regions beyond the 80th parallel, it is reasonable to infer that there is not a sufficient depth of water to float them away, if any are derived from glacier-bearing islands of that region. As explorers have gone north

of Europe, Asia and America, they have invariably met with desolate islands, isolated or in groups; for example, the Spitzbergen, Franz Josef Land, New Siberian, and De Long groups, Herald, Wrangell, Lonely, and Lockwood Islands, and the numerous ones of the American Arctic archipelago. Judging from the presence of these many islands on the borders of the unknown regions encircling the North Pole, and by the extensive areas of heavy ice drawn off by the cold currents—ice that brings distinct evidences of having been in contact with land, or of having been stranded upon shoals—it is fair to reason from analogy that more islands will be found within the unknown area of the polar basin.

It seems evident that drifting ice interspersed with islands of limited magnitude is to be found there—that no extensive polar lands—for the immense quantities of ice drifting out of the basin, and the apparent sweep of the great ice-bearing current in close proximity to the pole, will not warrant such an inference. Nor do the known facts sustain the theory of an open polar sea. The steward of the late Dr. Kane doubtless saw a body of open water from which mist arose, but he might have been able to cross it in half an hour with a row-boat. The very locality in which Morton reported the "Open Polar Sea," in 1853, was found by Sir George Nares, in 1876, to be blocked with what that able explorer termed "ancient ice." Again, in 1882, the advance of Lockwood's party was stopped by the presence of open water in the same vicinity. Such are the changes in the ice conditions of the Polar Sea. The ice as an entirety is in constant motion, actuated by the winds and currents.

Great patches of water, that the Russians have called "polynias," doubtless exist in places which, after a brief interval, may be encumbered with heavy masses of ice. The experience of the Jeannette Expedition gives strong support to this view of the subject. On several occasions, whilst she was beset in the ice, sudden movements of the main pack would open out water-spaces from which large volumes of moisture would rise into the cold atmosphere and be rapidly condensed. So it was during our retreat and boat-journey; large bodies of mist (water sky) were frequently seen, and to the south of the New Siberian Islands we came to bodies of water across which the ice was not visible, but a short sail would soon bring it into view.

From time to time extravagant statements of a tropical climate in

the far north have been published, but investigation has proved their unauthenticity. The further north we go the colder we find the climate, and the greater the formation of ice, unless both are modified by favorable local conditions, such as proximity of a warm current or of temporary water-spaces in the vicinity. The migration of birds has often been cited in proof of a milder climate in the extreme north. But on examination we find decided indications that there is a geographical limit to such migrations, and explorers who have been on the confines of the unknown region do not give much importance to the fact that a few sea-fowl go beyond the 80th parallel. It is well known that a desolate island may afford nesting places, and the neighboring water-spaces food supplies, for large colonies of birds during the short arctic summer.

#### CONCLUSIONS.

Having organized and presented the leading facts that are known about the arctic regions, I would suggest, before the reader forms his judgment as to the utility of further polar exploration, that we review and briefly discuss the principal claims for its importance that have been advanced by writers in its favor.

Geographical discovery has generally been stated as the chief object of such researches. The instructions of the National Academy, dated Washington, D. C., June 9, 1871, and prepared for the *Polaris Expedition*, say: "The appropriation for this expedition was granted by Congress principally on account of the representations of Captain Hall and his friends as to the possibility of improving our knowledge of the geography of the regions beyond the eightieth degree, and more especially to reach the pole itself." Further on the instructions say: "It is evident from the foregoing statement that the expedition, except in its relation to geographical discovery, is not of a scientific character," etc. Likewise it has been with other expeditions: geographical discovery has been given the foremost place.

The efforts of the present century have met with a fair measure of success in extending, step by step, our knowledge of the desolate lands in the extreme north, but the great geographical problem of the North Pole yet remains unsolved.

Granting that, at the times the recent expeditions were sent, geographical discovery was of sufficient importance to justify sending them, let us consider the state of the case to-day. It is obvious that

the mercantile value of the numerous islands already discovered is nothing, and, in my judgment, their chief importance is in giving indisputable evidence of what is to be found in the unexplored regions beyond, thus showing the futility of penetrating further into those regions.

The desired field of exploration is principally within the circle bounded by the eighty-fifth parallel of north latitude, and though extensive areas that are unknown are situated below that parallel, especially towards the Bering Strait side, yet the chief interest is directed to the central polar regions just named. The numerous facts set forth in the foregoing pages, and the well-sustained inferences drawn by analogy from what has been found and experienced at the extreme northern positions attained by explorers, all go to show that the unknown central region contains vast areas of ice interspersed with desolate islands that form summer abiding places for sea-fowl, but are of no value to man. The comparative importance of geographical discovery in different parts of the world should be weighed. British America has not been fully explored, and yet it has an area of 3,377,000 square miles, more than eight times that of the central polar region, which has 380,000 square statute miles.

The late discovery of the extent of Lake Mistissiny and of the probable commercial value of the region is of much greater importance than the combined work of all the late polar expeditions. The exploration of the central African regions, the Himalaya Mountains, and the extensive island of New Guinea, besides that of many other parts of the world, seem to be of so much greater importance that the utility of polar expeditions has been very justly questioned. In my opinion the probable geographical results are not of sufficient importance to encourage further exploration.

*Second.* Hydrographic research is held next in importance to geographical discovery. The formation of the sea-bottom, the ocean currents, the temperature, density and color of sea-water, the animal life it contains, and the action of tides, are all subjects of great interest that need thorough investigation, but it is not requisite to go to the central polar regions to carry on such work to the best advantage. Scientific expeditions should be equipped for the study and investigation of ocean physics, and the best field for operations lies below the 80th parallel, as witnessed by the work of the U. S. Coast Survey, and the British Porcupine, Lightning and Challenger Expeditions.



*Third.* Meteorology. The observations made in this branch of science by the numerous expeditions of the present century have furnished much important and interesting knowledge of the atmospheric phenomena of the arctic regions. Series of observations for one or more years taken in such isolated places and subsequently brought back to civilization are, however, too limited to sustain deductions and conclusions based upon them.

The results of the work of the twelve international polar stations have not been analyzed and published. It would, doubtless, take a specialist to form an intelligent judgment of their importance. All the polar stations, excepting Fort Conger (lat.  $81^{\circ} 40' N.$ ) and Cape Thordsen, Spitzbergen ( $78^{\circ} 30' N.$ ), were situated from seventeen to twenty-six degrees below the pole, and it is a matter of surprise that the American Expedition was placed so far to the northward of the others. There is no special reason for believing that the meteorological phenomena of the central polar regions differ essentially from those observed near the borders, and the possible advantages to be gained would not alone justify further exploration.

From page 72 of the report of the Chief Signal Officer I take the following interesting extract, viz :

“INTERNATIONAL POLAR RESEARCH.”

“The progress made by this office in the study of meteorology has for several years past confirmed the conclusion that, owing to the very mobile nature of the atmosphere, the changes taking place on one portion of the globe—especially the arctic zone—quickly affect regions very distant therefrom. The study of the weather in Europe and America cannot be successfully prosecuted without a daily map of the whole northern hemisphere, and the great blank space of the arctic region upon our simultaneous international chart has long been a subject of regret to meteorologists. I was, therefore, pleased to have an opportunity, with your permission, to carry out the promises of my predecessor, and to co-operate with the International Committee on Polar Research, which has during the past two years organized a system of stations in both the arctic and antarctic regions.

“These stations will conduct simultaneous hourly or bi-hourly observations in meteorology, magnetism and tides, and special observations on gravity, auroras, earth currents, earthquakes, etc. The



general object is to accomplish by observations made in concert at numerous stations such additions to our knowledge as cannot be acquired by isolated or desultory travelling parties. No special attempt will be made at geographical exploration, and neither expedition is in any sense an attempt to reach the North Pole. The single object kept in view is to elucidate the phenomena of the weather and the magnetic needle, as they occur in America and Europe, by means of observations taken in the region where the most remarkable disturbances seem to have their origin.

"By special Act of Congress I was empowered to establish a station beyond the limits of the United States, at Lady Franklin Bay (latitude  $81^{\circ} 40'$  N., longitude  $64^{\circ} 30'$  W.). An expeditionary force of twenty-four persons was detailed for this service, of whom eight were from the Signal Corps, the command being assigned to First Lieutenant A. W. Greely, Fifth Cavalry, acting signal officer and assistant.

"With your permission a second station was authorized to be established at Point Barrow, Alaska (latitude  $71^{\circ} 27'$  N., longitude  $156^{\circ} 15'$  W.), within the territory of the United States, and ten persons were selected for this service, four of whom were detailed from the Signal Corps. This expedition has been intrusted to the charge of First Lieutenant P. H. Ray, Eighth Infantry."

With characteristic American enterprise the Greely party tried to outdo the British Expedition of 1876, and, as previously mentioned, Lieutenant Lockwood and Sergeant Brainard reached the highest latitude yet attained by man. A full report of the observations made has not yet been published, but the most interesting discovery was that of a fertile belt of territory in Grinnell Land, as intimated by Lieutenant Greely in a recent number of *Science*.

The party at the second station, Point Barrow, Alaska, was ably commanded by Lieutenant P. H. Ray, and is reported as having been a complete success. If the results of the work at the twelve international stations prove of sufficient importance to make it war-rantable, doubtless there will be a repetition of the same scheme. The science of meteorology has been greatly advanced during the past twenty-five years by means of the telegraph transmitting simultaneous observations. It seems to me that the weather service of our country would be more improved by establishing permanent stations with telegraphic facilities in Alaska and British America than by sending temporary expeditions, attended with great expense, to isolated places on the borders of the polar ocean. The weather

predictions afforded by stations connected with the general system of the northwest would doubtless greatly increase in value over those now made, and, in the course of time, as deductive meteorology is developed, the line of permanent stations might be extended to the polar basin. It has been remarked by a specialist that the most favorable stations for weather observations are at the extremes of climate, the equatorial and the polar regions.

If that be the case, why have not stations been established near the equator, as well as within the arctic circle? Another fact appears strange to me, and that is why stations are not made in the coldest places now known, the northwestern parts of Siberia. It is true that one station was assigned to the Lena Delta, but that is several hundred miles from the more accessible Werkhojansk, said to be the coldest place in the world.

During the journey through Siberia, in 1881-82, I visited Werkhojansk and was informed by the Russians that the temperature of 70° to 80° below zero (F.) was not uncommon there in winter. We experienced intense cold, but had not the means for observing and registering it. In the Chief Signal Officer's Report for 1881 I find the following (pp. 1091-2):

#### “NOTES AND EXTRACTS.

[From *Nature*, March 19, 1881.]

“*Siberian meteorology*.—Up to the present time Yakutsk, in North-east Siberia, has often been cited as the place of our earth where the winter is coldest, while the minima observed during arctic expeditions are believed to be the lowest known. Neither the one nor the other is true. In Maak's book, ‘Olekminski Okrug,’ I find many data which prove that the coldest winter as well as the lowest well-authenticated minima were observed at Werkhojansk, to the northeast of Yakutsk. The name of the author gives us some guarantee that the observations are trustworthy. I give below the minima at some places cited by Maak, and compare them with those observed in Central and Western Siberia, and the arctic archipelago of America :

#### *Northeast Siberia.*

Serdze-Kamen.....	67°	N.,	173° E. (Nordenskjöld).....	—50.3 F.
Yakutsk .....	62°	N.,	130° E. (Maak).....	—77.3 F.
Wiljuisk.....	64°	N.,	122° E. (Maak).....	—76.3 F.
Werkhojansk.....	67½°	N.,	134° E. (Maak).....	—81.0 F.

*Central and West Siberia.*

Yeniseisk.....	58½° N., 92° E.....	—73.5 F.
Barnaul.....	53½° N., 84° E.....	—61.4 F.

*Arctic Archipelago.*

British expeditions, 1875-76.....	82½° N. Floeberg Beach (Nares)	—73.7 F.
	81½° N. Discovery Bay (Nares)	—70.7 F.

“The temperatures at Werkhojansk are the lowest of all given here, and it must be borne in mind that the observations lasted but one year, while we have more than thirty-five years at Yakutsk and eight and a half at Yeniseisk. The mean temperatures are as follows :

	Year.	July.	Nov.	Dec.	Jan.	Feb.	Mar.
Serdze-Kamen, 1 year.....	.....	.....	2.1	—9.0	—13.1	—13.2	—6.9
Ustjansk, 2 years.....	2.8	52.7	—2.2	—33.0	—38.9	—36.9	—17.5
Werkhojansk, 1 year.....	4.3	60.1	—29.2	—46.8	—55.5	—54.5	—29.0
Yakutsk, 10 years*.....	12.2	66.5	—20.5	—41.9	—46.8	—37.7	—0.0
Yakutsk, 24 years†.....	12.4	63.3	—19.1	—37.8	—41.4	—30.8	—8.7
Floeberg Beach, 1 year.....	—3.5	38.3	—16.8	—22.2	—33.0	—38.0	—39.8
Discovery Bay, 1 year.....	—4.2	37.2	—18.4	—24.5	—40.7	—35.0	—37.4

\* According to Maak.

† Old series of Neverof (1829-54).

“Though the observations were made only during one year at Werkhojansk, it is probable that it would have the coldest winter of all observed till now, as even at Yakutsk, which is the next coldest, January and February were in no single year colder than at Werkhojansk in 1869. From a comparison with the other stations of North-east Siberia it is probable that here in 1869 February was too cold and December too warm.

“Now, as to the reason why the winter should be colder in Northeast Siberia than on the North American archipelago farther to the north, it is to be found in the extent of the continent, the distance from any sea open in winter, and the prevailing calms. How important is the last reason is best seen by the comparison of the December and January temperatures of the last British Expedition. The more northerly Floeberg Beach is warmer, because more exposed to winds. Now, in Eastern Siberia, calms prevail to a large extent in winter, except near the coast.

“There is a phenomenon to be considered which is noticed everywhere in winter in high latitudes; during calms with clear sky the valleys are colder than the surrounding hills and slopes, because the

cold air sinks downward and stagnates there. This is confined to the night where the midday sun rises high enough, but in high latitudes during some months the midday heat of the sun is too small and the day too short to interfere much with the equilibrium of the strata of air established during the night. Even in middle latitudes ( $45^{\circ}$ - $50^{\circ}$ ), when calms and clear weather prevail very largely in December, the valleys are regularly colder than the hills. So it was felt in December, 1879, in Central Europe. What is an exception here is a rule in Northeast Siberia, because calms and clear sky are the rule in winter; the valleys are much colder than the hills. On this account the exceedingly low temperature of Werkhojansk in winter is probably not common to the whole surrounding country, and especially in the mountains rising to a short distance south we may expect a much higher temperature. The more we consider the conditions of the winter temperature of Northeast Siberia, the more difficult it seems to draw isotherms. We know that plains and valleys there are much colder than hills and mountain slopes, but how much, and what conditions are most favorable to that so-called interversion of temperature? I consider it as highly probable that both at Yakutsk and at Werkhojansk the local topographical conditions are very favorable to winter cold. This being the case it is quite natural that the latter place is colder in winter than the former, being situated  $5^{\circ}$  farther to the north, and yet far enough from the west to have a continental climate.

A. WOEIKOF."

From the foregoing facts and considerations I am of the opinion that the science of meteorology would not be greatly benefited by sending an expedition to the central polar regions.

*Fourth.* Next may be cited, briefly, the following, viz.: Magnetic, pendulum and auroral observations. Spectrum analysis, atmospheric electricity, astronomical and terrestrial refraction.

The north magnetic pole was discovered, in 1830, by Sir James Ross in Boothia, latitude  $70^{\circ}$  N. and longitude  $96^{\circ} 43'$  W., since which time it has not been visited. By the calculations of the best authorities the magnetic pole was directly north of London in 1657, and since that time it has had a westerly movement, the period of its revolution about the terrestrial pole being estimated at 650 years. It would seem that if magnetism and its kindred subject are of sufficient importance, a magnetic survey of the American Arctic archipelago should be made, for the central polar regions do not offer better fields and they are less accessible.

The international station at Kingava Fiörd, Cumberland Inlet, latitude  $66^{\circ} 36' N.$  and longitude  $67^{\circ} 13' W.$ , was the nearest one to the magnetic pole, and it doubtless made interesting observations in magnetism and auroral phenomena.

The most brilliant auroral displays are said to take place in the vicinity of the magnetic poles and also on the plains of Northeast Siberia, where one of the magnetic foci or places of greatest force is located. At such places magnetic observatories should be established and provided with instruments and trained specialists for obtaining the most refined observations possible. Should the heart of the polar regions be reached by an explorer, it is extremely doubtful that he would have the time or the ability to make the observations that could stand the rigorous criticism of specialists in the middle latitudes. Very good determinations of the magnetic elements might be made, but the delicacy of instruments and the accuracy required in pendulum and the other observations before mentioned could not be successfully attained under the circumstances in which an explorer finds himself in those regions. The Jeannette Expedition drifting in the ice found it impracticable to make delicate observations. The Tegetthoff and Germania parties had similar experiences, and the English at the Alert's winter quarters found great difficulty in making good observations even in the most carefully arranged "sub-glacial" observatories. Captain Markham (p. 206, "The Great Frozen Sea") says: "Under these circumstances it is no easy matter to handle delicate instruments, the manipulation of which even in a temperate climate requires the utmost care and caution. Made extremely brittle by the intense cold, a fall to any of the small movable metal parts of an instrument, such as needles, would prove fatal, yet it is almost impossible to touch them with uncovered hand. The breath freezing on the arcs and verniers of instruments during observation and on the glasses and mirrors of telescopes adds seriously to the difficulty; whilst the unequal contraction of different metals during intensely cold weather renders some instruments totally useless." There seems to be a misconception in relation to the practical value of magnetic observations made in the arctic regions, as shown by the remarkable statement of an eloquent divine, recently published in Harper's Magazine, as follows: "And Lieutenant Ray says the result of all these expeditions will be the doubling of the world's knowledge of the magnetic forces. That is to say, 'not one of all the thousand and ten thousand craft sailing to and fro among the many lands of earth but will be a little



surer of its compass, a little closer in its reckonings, a little safer than it was before.' Is this worth nothing?"

This interpretation is erroneous. Since the days of Marco Polo (1295), when he brought the compass from China to Italy, the improvements in that instrument have been gradually made by practical navigators and instrument makers. The intelligent methods for ascertaining and correcting compass errors have been derived from experiments and researches at observatories and compass stations near the chief centres of commerce, and principally within the past forty years since iron has been so extensively used in ship construction. In the practical use of the compass for steering the mariner has not been benefited by any arctic expedition. More knowledge about terrestrial magnetism would doubtless be obtained by a series of refined observations in China or Russia than by a series of comparatively rude observations in the polar regions.

The value of pendulum observations also depends upon rigorous accuracy which cannot be attained in the extreme regions of the north. The number of vibrations at the equator compared to that at the North Pole being estimated as 179 is to 180, and allowance having to be made for the wear of the knife edges and for the varying effects of temperature on the metals, the requisite delicacy of observation becomes apparent. During an arctic summer refined observations might be made by an expert, but that is the season for pushing to the northward. At a winter station in the best sub-glacial observatory that can be devised, there are great practical difficulties that prevent good observations.

In *Science* (Vol. IV., No. 9, p. 397), Mr. C. S. Pierce, of the United States Coast Survey, is mentioned as having presented the outline of a scheme for a gravitation survey of our own country, indicating the position of points, etc. Such a survey would be of far greater value than desultory operations in the far north. As far as I can judge the pendulum observations of recent polar expeditions have not been successful, but the opinions of specialists on this and the other subjects mentioned above would be of great value and interest.

The botanical, zoological, ethnological, and geological results of the further exploration of the extreme northern regions would doubtless be less important than those of former expeditions. Fine collections of flowering plants, ferns, and lichens have been made by botanists in Spitzbergen, Greenland, and Grinnell Land, all giving very interesting comparative studies. It is supposed that vegetation



reaches northward to the pole itself, but gradually decreasing in amount and variety, thus rendering those regions less remunerative than the many more extensive ones lying further south, which, though accessible every year, have never yet been fully explored. The same reasoning holds with regard to the animal life of the unknown regions. Exploration having already pushed into regions devoid of native habitation and of ancient remains, there is no justifiable hope of gaining ethnological benefits in this direction.

Much has been claimed in the interest of geology from further exploration. The remains of the hairy mammoth having been found at some places within the polar regions, it has been thought that continued research might show definite indications of an age when those regions enjoyed a tropical climate; but the expeditions of the past quarter of a century have not justified these expectations. The unknown results that might accrue have been stated as an encouragement for sending forth expeditions, but as there are definite scientific objects to be served in so many practicable fields of research, it would not seem good judgment to urge further polar exploration on such problematical grounds.

The time may come in the progress of civilization and advanced knowledge when the exploration of all the present unknown parts of the torrid and temperate zones shall have been completed, and it will then be the occasion to explore the ice-locked regions of the North Pole. The progress of invention has been such during the past two decades as to warrant the expectation that eventually balloon navigation will become feasible, so that the explorer may soar above the rugged ice-fields that now make the central polar regions inaccessible to ships of the strongest types.

After having served with one arctic expedition, and having devoted seven years to the study of the subject, as well as to the watchful observation of the numerous efforts and the comparatively insignificant results attending sacrifice of human life and of treasure, I unhesitatingly record myself as opposed to further exploration of the central polar basin, with our present resources. The gradual extension of observatory stations in the interest of meteorology, magnetism, and other scientific branches, should be made, but national support should not be given to another polar expedition.

## DISCUSSION.

Sir GEORGE S. NARES, K. C. B., F. R. S., Captain R. N.—*Mr. Chairman and Gentlemen*: I consider the paper an able and trustworthy resumé of our present knowledge regarding the several routes by which the North Pole may be approached. Lieutenant Danenhower does well, I think, to point out the danger that must be undergone by any expedition making Franz Joseph Land its base—in crossing the Barents Sea and having no continuous coast-line along which to retreat in case of accident. On the other hand, if I understand him rightly, I think he treats too lightly the danger of attempting to force a ship towards Lockwood's farthest on the north coast of Greenland.

In arguing that the polar ocean is navigable occasionally, Lieutenant Danenhower states that "Dr. Pavy . . . was adrift on the polar ocean for one day." "The heaped up ancient ice that Nares saw in 1876 was navigable for boats." "Lockwood was turned back by the presence of *open water*." If this means that the vicinity is ever navigable by vessels or even boats, I would earnestly impress upon arctic men not to be misled by the terms "open water"—a "navigable" water. A crack in the ice a few feet broad that will trouble or stop a travelling party unprovided with a boat is not sufficient for navigation.

On page 652 allusion is made to my supposed surprise at such a condition of the ice in the polar ocean. But in Vol. 2, page 47, of my work, I mention the likelihood of such a thing occurring, and in all my arrangements I ever prepared for such a state of things, and would certainly do so again. At the same time I am certain that no vessel will ever be able to *navigate* successfully in the Arctic Ocean north of Smith's Sound.

I fancy there is a printer's error regarding the ably conducted retreat of De Long's party, which if not corrected might mislead others to suppose that it was an easy matter to drag boats over pack-ice. On page 661 it is stated that the boats and sledges were dragged "over several hundred miles of rugged pack-ice." Of course such a journey never has or could be made.

Allusion is made to articles from the Jeannette Expedition having been picked up, after two years' drift, near Cape Farewell. This should be fully authenticated.

As to the final conclusion, I agree with the author of the paper that if we closely balance the intrinsic value of arctic exploration, and only guide our actions strictly by experience gained, then neither the scientific and commercial results of further research, however successful, undertaken with the sole desire of reaching a higher latitude, would compensate for the dangers that have to be undergone. But fortunately for the advance of our knowledge, neither individuals nor nations guide their action by such a close study. All enterprise would stop if we were never to act without being able to point to a decidedly successful and well-balanced result of our undertaking. Had the United States nation done so, then, the Jeannette Expedition would never have started, and we should have lost the glorious and invaluable lesson of self-

forgetfulness and ability in the leaders, and dutiful obedience until death in their followers, which is the just pride of their nation and of the world, and which will most undoubtedly bear good fruit in generations to come.

I take it to be of the first importance to a nation to foster within due limits a spirit of enterprise, and it is our duty to study the past and present history of our world. I venture to predict that further arctic research will be undertaken before many years are passed. Lieutenant Danenhower's paper may be usefully studied by those who initiate and take part in the work.

Chief Engineer GEORGE W. MELVILLE, U. S. N.—*Mr. Chairman and Gentlemen*: The voluminous compilation of arctic authorities whom Mr. Danenhower quotes, and the vast amount of work they have done, cannot be gainsaid by any one. Neither does it enter into the question whether they have selected the proper route for their explorations or their route for advance toward the pole. Their work was well done, and had its uses in giving the people of to-day the benefit of their experiences, whether happy or unfortunate. The people of the world are so much the gainers, and, "as there is no royal road to learning," the people of the present and of the future must work and suffer as did the people of the past; always bearing in mind, however, that the people of the present have the advantage of the experiences of the past, and if we are as careful and observant as we should be, we can mitigate the hardships of the work before us. Therefore, without hesitancy or fear of contradiction, I say that the explorers of the past have had their uses and have contributed their modicum of knowledge of which it is our duty to make use, and if in the future search for knowledge any should come to grief, it will be another lesson for our successors.

I cannot agree with Mr. Danenhower, however, either in his selection of route toward the pole or in his statement that because of the hardship endured or the loss of life and treasure, arctic research should be abandoned. Men are being born every day to die, and treasure is being accumulated by men and nations to be squandered in luxurious living which leads to the demoralization of men and nations; therefore, if men must die, why not die in honorable employment in search for knowledge—it matters not how meagre—rather than be sacrificed to the moloch of gain for the purpose of adding a few more thousands of dollars to the millions already accumulated that tend only to demoralize our manhood and make the god mammon paramount. Do we question for one moment the lives sacrificed on land and sea for gain only? Do not the ships sail, railroads run, the miners turn out their mineral wealth? And for what? Not alone that the laborer may gain his bread, but that the bondholder may gain his cent for cent. Is there any whim about the sacrifice of life when all these toilers go daily to meet their death? and go intelligently too; knowing that death lurks at every turn; yet, go they must; for is not the god mammon after them?

I say in the face of this moloch of gain, can we spare no man for the benefit of science? Must commercial gain be the gauge of every man's work in life? Far be it from us as a nation that our ideas of manhood should be dwarfed to

the size of a golden dollar. Woe, woe to America, when the young blood of our nation on land and sea has no sacrifice to make for science and for the information of our fellow-man, or gauges its life and services by its commercial value. Tell us not that the heroic youth of all nations has been sacrificed in vain in polar research, for where, in these piping times of peace, will we find such a school for heroic endeavor, unless it be in research in every clime, the reward for which is not in dollars, but in the laurel wreath that the winner puts beyond price, and which the commercial truckster cannot buy?

The work done by the heroes of three centuries, from the days of Willoughby and Barents down to the last days of De Long and Greely's heroic band at Cape Sabine, have all had their uses, have contributed their share of knowledge to all men, and have added much to the commercial wealth of the world, and let no one with a spark of manhood say it was in vain. While there is one square foot of the globe unexplored, it is to be hoped there is sufficient disinterested uncommercial manhood among the youth and wealth of America to make the sacrifice of comfort and effeminate luxurious living, to face all hardships, all dangers, to solve the uncommercial problem of the pole.

I cannot agree with Mr. Danenhower in his selection of the Smith Sound route toward the pole. This route is through a narrow strait, or "*Lena Contracta*," where the ice is crowding down through the narrow channel between Capes Alexander and Isabella and the narrow channels to the northward, receiving the ice from the funnel-shaped north entrance to Robeson Channel, where it is barely possible for ships to be able to make a safe passage north of  $78^{\circ} 40'$ , and where the probability is greater of being crushed in the narrow channels.

There is absolutely no navigable difficulty in carrying a ship as far north as  $78^{\circ} 40'$  every year through Baffin's Bay to the mouth of Smith's Sound, because of the large bay to the southward of Cape Isabella, where the ice, after being ground up and broken in passing the narrow channel between the capes, has room to scatter in the large bay to the southward. Not so will the navigator find it to the north of the Capes Isabella and Alexander, where the ice, as it comes from the northward, is packed in after the manner of corn in a hopper. And for the very reverse of all these reasons set forth against the Smith Sound route, I point to the advantages of the Franz Josef Land route.

Measure with the eye the difference of the width of the channels of the approach to latitude  $81^{\circ}$  or  $82^{\circ}$  to Lady Franklin Bay, on the one hand, and to the south end of Franz Josef Land on the other. Supposing that the same influence is at work tending to carry the ice to the southward between Novaya Zemlya and Franz Josef Land that there is in the channel of Smith Sound, and our experience is that the ice runs with greater velocity to the southward through Smith's Sound than it does in Barents Sea. But as it is necessary to carry the supplies for a base of operations in ships, it becomes paramount at once that the base be as safe for ships as possible. If any one will take a look at the Circumpolar Map and see with what freedom the ice can scatter to the southward of Franz Josef Land as it is carried to the southward and westward by the polar current, can he question for a moment the easy access to the south side of Franz Josef Land?

Let us look at the recorded voyages toward Franz Josef Land since the time of Barents. There really are but two. Barents followed the coast of Novaya Zemlya to the north and eastward. Weyprecht and Payer, in both the Ice Bear and the Tegetthoff, bore away to the eastward, and it was only the counter current that caught the Tegetthoff and carried her down in a SW. direction and made the accidental discovery of Franz Josef Land. After abandoning their ship, they marched less than one degree of latitude on their southerly course, when they launched their boats and sailed with safety to Novaya Zemlya, thence home.

Leigh Smith, in the yacht Hope, made a successful summer cruise to Franz Josef Land, and, after the season's sport, sailed his vessel home in safety. During his second cruise, he readily made the south side of Franz Josef Land, and in working to the northward, along the west coast, while embayed in a small cove, the tail end of a floe-piece in a twirl (or eddy) pushed his vessel up on shore, and she was destroyed. But this is something that might happen from running ice in any of our navigable rivers in the winter time, from the Potomac to Boston harbor. Vessels are often cut through or pushed up on shore in the Potomac, the Delaware, and in New York and Boston harbors. Yet these rivers and harbors are not abandoned in the winter time on that account.

After the Hope was abandoned, Leigh Smith and his boats' crews, without marching a mile, launched their boats, sailed away in safety, and landed at Novaya Zemlya, showing this to be a perfectly safe route. And the reason why it is a perfectly safe route is, because of the open water space to the southward of it, making room for the drifting ice as it passes to the southward, two ships' companies having made their retreat without the ordeal of a long march to open water.

Now the south end of Franz Josef Land is in about the same latitude as the north end of Spitzbergen; and upon the well accepted theory, that in an approach toward the pole it is necessary to have the land to hold on to, at least until we are within easy marching distance of the pole, Franz Josef Land is far superior to Spitzbergen, and no doubt it is as readily accessible. The water to the west of Spitzbergen, being a favorite feeding ground for whales, caused it to be more frequented by whalers, hence its early discovery. Being easily accessible by ships for a base of supplies, it was adopted by Sir Edward Parry as his starting point in his sledge journeys toward the north. But had he known of Franz Josef Land and its accessibility, who can doubt that he would have selected it as the point from which he would have made his march toward the pole?

Franz Josef Land has the two essential features recommending it as a base for an advance toward the pole: first, perfect safety of approach and retreat; second, its high latitude. These features are not combined in the same degree by any other route. As the north end of this land is unknown, we can only surmise how far it extends to the northward. But if it extends to  $85^{\circ}$  north latitude, it will carry the explorer far north of the *rapidly* moving currents that are encountered further to the southward. For I cannot believe that in so shallow a sea as the



arctic basin is known to be, so far removed from the heat currents generated at the equator—the sun being the source of all motion on the surface of the earth—that it is possible there can be a current crossing the pole, or that the Gulf Stream has sufficient vitality to extend beyond  $85^{\circ}$  north latitude. If my theory be correct, we cannot have the broken, hummocky ice over which Markham and his party travelled or that traversed by the retreating party from the Jeannette. Neither party passed over a paleocrystic sea of ice, but over the ice that was moved hither and thither by currents and gales. If there is a paleocrystic sea of ice, it is north of  $85^{\circ}$ , where the equatorial currents never reach it; where there is no rolling sea to break it up and carry it out, and where the winds and snows only tend to level and smooth the ice, be it afloat or ashore.

In speaking of the safety of ships, I do not intend that my hearers shall suppose, for a moment, that I intend the use of ships for any other purpose beyond carrying supplies to a point of safety and returning. The advance toward the pole must be made on foot or by deer or dog teams, if a smooth paleocrystic sea of ice is found to the north of the broken “tarrassy” and hummocky pack.

If the ice to the north of  $85^{\circ}$  is as broken as that over which Markham and the Jeannette crew travelled, dog and deer teams alike would be useless, as neither can travel and haul sledges over such ice as that through which the Jeannette crew cut their road for 300 miles before reaching open water.

The folly of trying to force ships against the ice of the Arctic Ocean is only equalled by the light and fanciful notion of constructing balloons of oiled silk to stand a sufficient force to work to windward against a wind moving 10 miles an hour, when any novice who has been at sea and has seen a foresail or a topsail torn out of the bolt ropes by a half a gale of wind, cannot for a moment conceive of a balloon, made of light material, large enough to float in the air a vessel of dimensions sufficient to carry a motive power working a reactionary wheel of any construction against a medium as light as air. Both projects to my mind are equally absurd, and if the pole is to be reached, it will be by march from the north end of Franz Josef Land; from island to island, if they exist, or across the floe if at rest.

I here record myself for the observer of future expeditions toward the North Pole: That the Franz Josef Land route will be the one selected, and that by this route the highest point, if not the pole itself, will be reached.

Prof. J. E. NOURSE, U. S. N.—*Mr. Chairman and Gentlemen:* As to the merits of the question of further efforts for finding the pole, at least by additional or chiefly national aid, I have no hesitation in expressing my belief that it would be unwise, while it seems impossible to think otherwise than that private efforts will be made, if only to show that daring which belongs to man and the curiosity of the race. There is enough surely in the history of past efforts, especially, I may say, in those of Americans and of our own navy, to keep alive a true heroism which itself may prompt any number of volunteers. As to the scientific aims such as prompted the two late expeditions, I feel sure



that they will continue to command the sympathy and the genius, and, after a while, the aid not only of the patriotic among the people, but of the Government. It was a great pity, I think, that Ray was recalled. And it was exceedingly unfortunate that for Lieutenant Greely's expedition something was wanting in the planning and carrying out of that mission. If it had been a success, would not ready aid have been the outlook for further efforts which would, and will some time or other, bring additions to our knowledge of the physics of the weird North, and which will prove of lasting value in enlarging the horizon of the sciences?

I do not consider myself at all competent, however, to discuss the topics which present themselves at the very threshold of arctic investigation; and therefore I do not consider this as worthy of further use than as a return of thanks for your kind invitation to discuss this question.

Dr. H. RINK, Ex-Governor of Greenland.—*Mr. Chairman and Gentlemen:* As Lieutenant Danenhower's paper did not reach me until September 16th, I feel obliged, for lack of time, to restrict myself in this discussion merely to expressing my opinion in regard to the chief contents of the said paper:

1. Upon inquiring into the origin and distribution of icebergs produced by the ice-fiörds of Greenland, I have arrived at conclusions similar to those quoted by Mr. Danenhower (pp. 674-675). I believe that smaller islands, or groups of islands, but no land of any considerable extent, exist in the unknown regions around the North Pole, excepting it may be in the still not wholly explored northernmost part of Greenland. While, on the other hand, I do believe that a land of more or less wonderful character exists in the greater part of the unknown antarctic regions.

2. The geographical aim of an expedition directed toward the North Pole should be limited chiefly to ascertaining the existence of such islands, and to determining their size and situation. In regard to the other scientific researches that might be combined with such an expedition, I believe that the usual hydrographic labors would be highly impeded, if not excluded, by the immense difficulties that would be experienced in navigating the arctic basin; and I may venture to assert the same in regard to the meteorological and magnetic observations. Consequently, the scientific results to be expected from the undertaking do not seem to be equivalent to the dangers and expense caused by it.

3. If, in accordance with what has been here asserted, expeditions for reaching the North Pole were abandoned, the question arises whether the solution of any similar problems, and especially that of extending the discoveries already made, might be deemed practicable.

If the answer be in the affirmative, I would suggest that we consider:

1st. The problem of exploring the yet unknown regions of the northernmost part of Greenland.

2d. The advantage of fitting out an expedition for the purpose of crossing Middle Greenland from west to east.

I have given my reasons for making these suggestions more explicitly in a paper read before the American Philosophical Society, March 20 of this year, and which was printed in their Proceedings.

Lieutenant A. W. GREELY, U. S. A.—*Mr. Chairman and Gentlemen:* I should have been glad, had time permitted, to comment at some length on Lieutenant Danenhower's paper. The merits of the essay in a certain direction, I have no inclination to deny, but its tendencies seem to me particularly unfortunate, and I regret that it should have emanated from an officer of the service.

I consent to the general proposition that, from a strictly utilitarian standpoint, polar explorations do not directly pay. As to whether the subsequent scientific results are commensurate with the cost, I do not even urge, knowing that it would be a waste of words here to argue a question which has been so elaborately and fruitlessly discussed, with no definite conclusion. I leave Lieutenant Danenhower his opinion, though eminent scientific men in Germany, England, and America believe that systematic and scientific polar work (I advocate no other) is worth its expense.

My class motto was "Give a man his due" (*Palmam qui meruit ferat*), and on that ground I take issue with Lieutenant Danenhower on two points. Of polar work he says that Weyprecht's discovery of Franz Josef Land is the most important discovery of the century.

In 1852 an arctic voyage was made by an Englishman, which for these sixty years has changed the current of arctic work. Captain (since Admiral) Inglefield, in 1852, found that Smith Sound was not a closed bay, and, in his short voyage alone, marked out more new coast than is known to this day in Franz Josef Land. What Kane, Hayes, Hall, Nares, and my own expedition did is well known, and such honor has come to us from that quarter that Smith Sound is known distinctively as the American Polar Route. The results of Inglefield's discovery has been the addition of land covering nearly seven degrees of latitude and fifty degrees of longitude. We know, to-day, accurately the condition of ten times, and approximately of at least twenty times, the amount of land through Inglefield's discovery than we do through Weyprecht's. If Lieutenant Danenhower favored the Franz Josef route to the pole as I do, his bias in favor of Weyprecht would be comprehensible. So let Inglefield have his due.

The second point, that the voyage of the Alliance was the most hazardous search expedition since Kane, I approach with a certain delicacy. Commander Wadleigh was searching for De Long, Captain Schley for me; and yet I think Commander Wadleigh must consider Lieutenant Danenhower's a doubtful compliment, that he should, through failing to conform to his instructions or by unskillful navigation, put an unprotected and unfit vessel into an arctic pack. Apart from its ice dangers, the voyage to Spitzbergen is certainly liable to heavy gales and bad weather, though all these dangers are yearly met by common fishing smacks, with only sail power. All honor and credit to Commander Wadleigh, who willingly ventured, in such a vessel, to such a remarkable latitude for humanity's sake.

The relief squadron of 1884, however, pushed at the earliest possible moment into the most dangerous ice navigated in these days. The story of its dangers has been modestly told by its chief, and the world knows how well they held their own in a race with an unsurpassed class of ice-navigators—the hardy and

bold Scotch whalers. If its dangers are thought to be overdrawn, an opinion as to the character of that navigation can be had from a man (Chief Engineer Melville) whose cool courage, self-possession and calm judgment, many times tried in the conflicts of the late war, have later been put to the test in two hemispheres, by experiences of all dangers possible for an arctic navigator. So let Schley, Emory, and Coffin, with their brave subordinates, have their due.

But to pass to the main question. On moral grounds, the highest of stand-points, I believe that to the navy such explorations bring results commensurate with their cost.

On similar grounds to those taken by Lieutenant Danenhower, the various exploring expeditions across the Isthmus of Darien, pursued so heroically by the officers of our navy, at the cost of treasure, health, and life, must be condemned. So, too, must be placed under the ban all hazardous or even scientific service not strictly in the line of the navy, provided it does not pay in good sound coin; and, while continuing for commercial purposes the surveys of our coasts and seas, we must no longer sanction the deep-sea researches in which Belknap, Bartlett, and Sigsbee have so worthily upheld the credit of America and its navy. Does not such an argument sap the very foundations of the navy? Is it not lowering the standard of our navy, making it a well-found, well-paid service, whence the Gold Coast, the Arctic Circle, and everything dangerous, extra-professional, and unpleasant, save the ordinary perils of the sea, should be eliminated?

In time of war, the duty of the navy is clear. In time of peace, I believe its duty is to prepare for war by cultivating those qualities of daring seamanship, indomitable energy, and prudent daring which result from varied and dangerous service. Such training has not been wanting in the past, and the highest standard of professional daring and ability which has frequently made the American Navy the wonder and admiration of the world owes no small debt to similar extra-professional services deemed often too dangerous and unprofitable. Arctic service should be work for peace time only, serving as a training-school for war's harder task, which God forbid should ever come.

England honored Nelson by selecting him for service in the arctic seas; he honored her at Trafalgar. Holland rejoiced over Heemskerck with Barents in Nova Zembla; it gloried him at Gibraltar. America, with discrimination, sent Wilkes, a junior, into the antarctic sea. Was there a loyal heart which did not thrill with pride at his later daring in the Great Rebellion? If sober second thought and wise statesmanship disapproved, none the less did all rejoice that the American sailor dared too much rather than too little.

Rodgers' work in the arctic seas stands second only to his later war service. De Long, Chipp, and others gave promise in their previous records of the men they were in the Arctic Ocean, or in the Lena delta. I recall De Haven and Harstene, serving, both in the arctic and antarctic circles, and Kane in his second expedition, all officers of our navy whose glorious labors and sufferings, whether on scientific errands, or on missions of humanity, were of the class which do not "commercially" pay.

Of the living who in the Eastern and Western Hemispheres have displayed

in their arctic work the sturdy bravery and strong endurance, burned in their noble natures by the fires of our great civil war, I will not speak; but will the record of their deeds, second I grant you to those of Farragut, Perry, and a score of others, fade away without stirring up in the youth of our navy an abiding zeal to emulate the daring endurance and energy of these men in peace as of others in war?

Arctic service in the English Navy is prized for the opportunities it affords for the development of the qualities to which I have alluded. I am too unfamiliar, to my shame, with our naval history, but I feel sure of our navy, as all Americans do. In willingness for service, in bravery for conflict, in resources for emergencies, they have never failed the nation. The American Navy asks no one to forefend it against such perilous service. It asks neither legislative prohibition against compulsory arctic details, nor the building up of a hostile public opinion to discourage them.

Wilkes! Rogers! Kane! De Haven! Harstene! De Long! The record of what these men did America would not erase from the tablets of her history for quadruple the money that arctic work has cost her. Their names and work remain to us, to the glory of the English-speaking race throughout the world, to the eternal honor of our great nation and its navy.

Lieutenant J. W. DANENHOWER.—*Mr. Chairman and Gentlemen:* In reply to the gracefully made comments of Sir Geo. S. Nares. I agree with him entirely "that no vessel will ever be able to navigate successfully in the Arctic Ocean north of Smith Sound." It is very probable that no ship will ever reach as high a latitude as Cape Union, near where his ship wintered in 1875-6. Future work in that locality will doubtless be with properly equipped sledge parties operating from a base established as far north as possible. The prominence given the Smith Sound route by the success of Lockwood is an encouragement to the scheme that sledge parties with mounted boats might reach the vicinity of the pole by that route during an open season.

The statement on page 661 of my paper is correct. The retreat of the *Jeannette* party naturally divides itself into three stages:

First. The boats and sledges were actually dragged over several hundred miles of rugged pack-ice, though not in a straight-away course. The distance from where the *Jeannette* sank to Cape Emma, at the southeastern extremity of the newly discovered Bennett Island, is about 90 miles as the crow flies. The journey to Cape Emma was over the rugged and drifting pack from June 17 to July 27, a period of forty days, during which boat navigation was never possible, the narrow cracks and wider leads being detrimental to the work, for they had to be crossed on rafts of ice or by means of temporary ice bridges formed by large cakes held together with hooks and ropes. During part of this time the ice-fields were drifting and our party was carried to latitude  $77^{\circ}42' N.$ , more than twenty-seven miles beyond the starting-point. For more than two weeks there were *seven* loads to be transported; the snow being so heavy and the ice so rough that the entire working force was required to move one boat or one loaded sledge, hence, thirteen trips were necessary, seven to the southward with loads and six to the northward empty-handed. The party had to

travel back and forth twenty-six miles in order to make two miles good to the southward, which was considered a big day's work. Over the most broken ice encountered it required twelve hours of arduous work to advance the three boats and four provision sledges about 1000 yards. After the snow melted the traveling became better, the loads were decreased to four in number, only seven trips were necessary and our progress was greatly facilitated. These repeated trips were not over the same roads, for in many instances the roads first picked out and travelled over were broken up by movements of the ice. The easiest work was in moving across some extensive fields from one-half a mile to two miles wide with undulating surface, many ice knolls, and large pools of brackish water through which the party waded.

It is therefore fair to state that the Jeannette party did actually travel over several hundred miles of rugged pack-ice during those forty days. I hope this description may convey a correct idea of the first stage of our retreat.

Second. The journey from Cape Emma (Bennett Island) to Cape Medveji (south end of Kotelnoi) was made through drifting ice, sometimes making long stretches in lanes of water, frequently dragging the boats and carrying the stores over large fields that barred progress, and also making a few portages on the shores of the New Siberian Islands. This journey occupied about thirty-five days, and the distance, as we went, was at least 250 miles.

Third. From Kotelnoi Island to our landing place was a distance of 250 miles, performed in ten days, entirely in boats, and the last 100 miles free from ice. We commenced the retreat on June 17, and landed on September 17—though it was not till several days later that we were rescued by the natives.

I agree heartily with Mr. Melville that the vast amount of work already accomplished by arctic explorers has been well and nobly done; but since every feasible route to the North Pole has been explored, and without success, in reaching that goal, I think it is about time to call a halt and to ask men interested in the subject what substantial benefits to mankind are likely to accrue from further attempts!

There is nothing in my paper to justify the expressions of Mr. Melville and Lieutenant Greely to the effect that lack of commercial benefit or gain in dollars and cents is my chief reason for urging that polar exploration should be discontinued.

My conclusion that only limited geographical results may be expected from further research is not questioned by them, and I am glad to see it is supported by as able authority as Dr. Rink. The *unimportance* of arctic geography compared with that of British America, Asia, and Africa is not questioned. The difficulties that prevent refined observations in magnetism, gravity, spectrum analysis, atmospheric electricity, astronomical and terrestrial refraction, are not questioned by these gentlemen. They do not speak of any definite scientific benefit to be gained, but principally of "glory."

Lurid rhetoric and sentimental phrases may appeal to romantic and adventurous spirits, but they are not arguments and they have no weight with thinking men. There are better directions for the display of true manhood and heroism in the everyday life of our great cities. The circumpolar regions are not to be



regarded as the great arena in which heroic youth may pose as gladiators battling for science against the ice-monsters of the North! The real devotees of science may find better channels for their self-denying efforts. Medicine and surgery, chemistry and all the natural sciences award greater distinction and higher honors to the worthy and successful investigator than the ephemeral notoriety and so-called glory of the arctic explorer.

In regard to Lieutenant Greely's paper and his irrelevant allusions, I would say that whether the Greely Relief Expedition of 1884 deserves more or less credit than the Jeannette search parties; whether Weyprecht and Payer are entitled to more or less glory than Captain Inglefield; whether such invidious comparisons are in good taste; whether Mr. Greely's citation of the work of Admiral Wilkes in the Antarctic and during the war is a happy one; whether the Arctic Ocean is a good or bad locality for training naval officers; and, finally, the question of the employment of the navy in peace-times are all subjects that have no bearing on the polar question as I have put it forward in the paper now under discussion.

Putting the glamour of so-called glory out of the question, I have endeavored in this paper to set forth the most important information at my command, and to draw such unimpassioned conclusions as the evidence before me should justify. I find nothing in the statements of Chief Engineer Melville or of Lieutenant Greely to cause any change in my conclusions.

Captain CARL KOLDEWEY, Commander of the German Arctic Expedition 1869-70.—*Mr. Chairman:* I share with Lieutenant Danenhower the opinion that exploring expeditions to the North Pole, or the highest attainable point, would result in developing little or nothing of a practical or scientific value. Arctic expeditions for the exploration of parts of the arctic continents or lands will always be of more or less value to science. Nor will mankind, for any length of time, cease making these explorations. It appears to me at present, however, that previous arctic expeditions have had the effect of pushing the more important unsolved scientific problems into the background.

I have the honor to present to the Naval Institute a copy of a report which I delivered before the Geographical Society in Munich last year.

The CHAIRMAN.—*Gentlemen:* Lieutenant Danenhower has raised the question whether the scientific results of arctic expeditions are worth the expense and risk which is entailed by such enterprises. It has been the opinion of statesmen, of men of science, and of seamen during several centuries that these results are well worth all the difficulties and hardships that must be encountered in securing them. Moreover, it has been considered by the highest scientific authorities that, as human knowledge has increased, so the results of arctic research have become more valuable and more varied. I have myself served in an arctic expedition, and I have devoted many years to a study of the subject. I therefore venture to express my opinion that the great array of authorities on the arctic question is planted on firm unassailable ground, and that the more recently formed conclusions of Lieutenant Danenhower, though very ably stated and based on careful study, are mistaken.



The value of the results, in some branches of science, we must accept on the authority of others. As regards geography and hydrography, some of us can speak with the confidence of personal knowledge. I venture to think that Lieutenant Danenhower confuses the science of geography with the application of geographical knowledge to commerce. I maintain that geography is a science, and that the results of any given geographical investigation must be tested with reference to its increase of our knowledge of the abstract science of geography. This, I submit, is the true test; and by that test arctic research will be found to stand very high indeed. I look back at the state of arctic knowledge when I first began to devote my attention to the subject—now nearly forty years ago; and when I compare our knowledge then with what it is now, I am deeply impressed with the immense advance that has been made. When Sir John Franklin sailed to discover the northwest passage, the whole vast region from North Somerset southwestward to Cape Barrow was a blank, representing absolute ignorance. Now we know the geography of that region; and *that* knowledge teaches us why Sir John Franklin failed; it displays to us the distribution of land and sea, the flow of currents, the nature of the country—its geology, fauna, flora, and climatic conditions, the meeting of tides, and numerous other phenomena of great scientific interest. Is such knowledge not worth having? As a geographer, I warmly deprecate any such conclusion. Equally important additions to the sum of human knowledge have been made in other sections of the polar regions; and it is surely a fair deduction that more valuable, because more extensive, geographical results will be secured by researches in the still unknown area round the pole.

Observations of the sun's spectrum in the far north, where the sun is at a low altitude for a much longer time than elsewhere, and where better opportunities are thus afforded for more deliberate observation, are great *desiderata*. When the sun is near the horizon additional lines and bands are seen in the spectrum. Most of them are doubtless due to watery vapor, but it is conjectured that others may be due to some other constituent of the earth's atmosphere still unknown, and in such minute quantity as to elude chemical tests. In the far north the absorption due to aqueous vapor is reduced; and most useful observations of this nature may be made by future arctic expeditions, leading to scientific results of great value.

As regards geology, future polar explorations will be of the highest scientific value. I will not dwell upon the conclusions of Count Saporta with regard to the origin of life at or near the North Pole, nor on his reasons for the belief that, for a long period, life was active and productive only there. It is enough to refer to actual geological discoveries in the polar regions, and especially to the existence of fossil forests. Geologists consider that further investigations with reference to the extent and distribution, in the unknown area, of the highly organized vegetation of the miocene period, and to the evidence derived from these polar plants as to the physical conditions of the globe in past geological epochs, is of the greatest importance. Observations on the extent, height and range of glaciers, on their effects on the surface of the land when composed of different classes of rocks, are also of much value.

Meteorological and magnetic observations in the undiscovered area will be of great practical usefulness. One example may, perhaps, impress this on the mind as well as a long dissertation. In the winter of 1875 a very extraordinary rise of temperature took place at the Danish settlements in Greenland; which was scientifically explained as being caused by a wind analogous to the Föhn of the Swiss Alps, blowing across the continent. Now it is most remarkable that, a day or two afterwards, a similar rise of temperature was observed on board the *Alert* in 82° N. It will at once be seen how useful such a coincidence in observation must be to those who are engaged in the study of meteorological phenomena. This is one example out of hundreds of the same kind that might be adduced.

Botanical researches in the polar regions are also of the highest value, and these researches refer mainly to the very peculiar distribution of plants, leading to conclusions of great scientific interest. I may mention that there is one species which is found only in West Greenland and in the White Mountains of New Hampshire. It will at once be understood that it is only by the patient collection of such botanical facts over the whole polar area that sound scientific conclusions can be reached. Sir Joseph Hooker, one of the greatest living botanical authorities, has himself devoted much time and attention to the study of the distribution of the polar flora, and has developed an interesting theory on the subject. He attaches great importance to botanical collections in all parts of the arctic regions, and it must be remembered that his own researches were dependent on the labors of arctic explorers.

Specific results in zoology, within the arctic circle, are numerous and interesting. The arctic seas teem with minute organic beings, and the multitude of kinds is prodigious. Respecting the value of polar research in this branch of science, there is a consensus of opinion; and there is also much to learn respecting breeding places of birds and the habits of large mammals. Nor are the remains of man, occasionally found, of small interest to the ethnologist.

These are my reasons, very briefly and inadequately stated, for disputing the conclusions of Lieutenant Danenhower.

The scientific results to be obtained by researches in the unknown region fully justify the promotion of polar enterprise, and the despatch of expeditions by governments. If the funds are adequate, if a thoroughly well thought out plan is matured for securing the safe retreat of the explorers, and if the best means are supplied for preventing disease, there is no undue risk. Great achievements remain to be done. The south coast of Franz Josef Land can be reached almost every season, as we know from the voyages of De Bruyne and Leigh Smith, and from that starting point great and valuable discoveries will certainly be made. Lieutenant Hovgaard adduced sound reasons for his belief that there is extensive land to the north of Cape Chelyushin, and the question still remains unsolved. Then there is the completion of discovery along the north coast of Greenland, and in the direction of Jones Sound, besides several minor pieces of geographical work.

But scientific results, great and important as they assuredly are, can never be the only reason for arctic adventure. Great statesmen, both in America and

in the old country, have wisely fostered it from other motives as well. This is peculiarly a naval question. Wise and prudent statesmen have clearly seen that it is well to encourage the maritime enterprise of their countrymen, and to seek for openings in which it can have a field, and that there is no better opening than one which calls forth all the highest qualities of a seaman. In this respect America has nobly taken her place in the first rank. I rejoice to have this opportunity, on American ground, of expressing my admiration for the gallantry and noble endurance of Greely and his companions, in one part of the polar regions; and of my lost friend De Long and his brave comrades, and of Berry and those who came to his rescue in another. I join issue with Lieutenant Danenhower as to the modest estimate he gives of the work of the Jeannette. It was noble work, so far as it went, but it must be finished. The unknown area must be explored, and there is, therefore, much more such work to be done. Nowhere should this doctrine be more clearly inculcated than in this place. I would respectfully submit that at least one of the aspirations of the young officers who are being trained here should be to win renown in polar research. They should resolve that the race of De Havens and Griffiths, of De Longs, Melvilles and Danenhowers, of Greers and Berrys must not be allowed to die out. May I be allowed to wish the rising generation of American naval officers all success in the noble profession they are entering, and to express a hope that America, and especially the American navy, will maintain the place she has won in the front rank of arctic explorers.



Chart to accompaniment of meteorological stations are marked











## NAVAL INSTITUTE, BOSTON BRANCH.

LIEUTENANT E. T. STRONG, U. S. N., in the Chair.

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### THE CRUISE OF THE ALLIANCE IN SEARCH OF THE JEANNETTE.

BY LIEUTENANT C. P. PERKINS, U. S. N.

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After making hasty preparations at Norfolk, Va., consisting in the addition of a light bow sheathing, storm hatches and bulkheads; sending the battery and ordnance stores on shore, and filling up with coal and extra provisions, the Alliance left Hampton Roads June 17, 1881, on a novel and extraordinary cruise. The run to St. Johns, Newfoundland, was made in eight days under very favorable circumstances. There we found the most unfavorable reports regarding the season. It was said the Alliance could not even make Iceland, as the ice was reported to be remarkably low and fast. Efforts were made to obtain a pilot for the coast of Iceland, but there seems to be little or no communication between Iceland and Newfoundland, so that not only could we find no pilot, but could obtain no information whatever, not even in regard to the coal supply. We therefore filled up with coal, carrying large bins in each gangway and piles of bags on the quarter-deck, and continued on our way, and with the exception of a twenty-four hours' gale from the SW., encountered immediately after leaving St. Johns, the run to Iceland was remarkably pleasant and delightful, the sea being generally smooth, undisturbed by a ripple.

Reikiavik, Iceland, was reached about ten o'clock on the evening of July 9, and as the last day's run had placed us sufficiently far north to have continual daylight, many of the officers were on deck at midnight watching the natives as they pulled around the ship, regarding with surprise the first American man-of-war ever in their waters. We found the French corvette Dupleix in port and obtained some information from her officers in regard to navigation around Iceland; also the English yacht Vanadis, whose commander,

Lieutenant McIvor, R. N. R., kindly took charge of our mail on his return to England. Unsuccessful efforts were made to procure pilots for the coast of Norway, but it was suggested that among the Norwegian fishermen who frequent the eastern coast of Iceland during the summer months, we might procure some one familiar with the coast about Hammerfest. Coal was found in sufficient quantity to enable us to fill up as before, and arrangements were made to insure a supply on our return in the autumn. Little, if anything, could be learned in regard to the ice, the Icelanders living an isolated sort of life, absorbed in fish, sheep, and horses, entirely careless of the outside world.

On the 15th of July we left our anchorage off Reikiavik, and skirted close along the coast to the southward and eastward, with clear and pleasant weather—another charming trip. We obtained views of many tremendous mountains and glaciers, among them Mount Hecla, and noted a remarkable change in the appearance of the shores as we rounded the southern point of the island. While the land had heretofore appeared bleak and desolate, it now was snow-bound and covered with ice, giving unmistakable evidence of the southerly cold current along the eastern shores. Keeping close to the coast, we ran into Seidis fiord and held communication with some Norwegian fishing vessels. From them we learned that only vessels from the southern part of Norway came to these waters, and consequently all hopes of a Hammerfest pilot were given up, and putting the ship about we continued the cruise with remarkably good weather for eight days, reaching Hammerfest on the 24th of July. The similarity of the peaks along the northwest coast of Norway makes the land appear like a row of saw-teeth at a distance, but as it was our good fortune to have fair weather, no difficulty was experienced in making the entrance through Soro Sund, through which a pilot who had served in our navy during the war took us into the harbor of Hammerfest, the northernmost city of the world.

Here again we received the most discouraging reports regarding the ice. It was said that the fishing fleet had been driven back by the ice; that it had not been known so low for forty years, and that the Alliance was not properly fitted and ought not to make the attempt. This, from people who pass their lives in the vicinity of the ice, was not very encouraging; nevertheless, after a stay of five days, during which we obtained a pilot for Spitzbergen, and filled the ship with coal to her utmost capacity, we started on our cruise into the new and untried waters of the Arctic.

Although large quantities of ice had been reported in the vicinity of the Grand Banks just before our departure from Hampton Roads, our expectations of encountering it were not realized. The greatest caution was exercised, and the strictest possible lookout kept, but St. Johns was reached without a sight of even the ice-sky. This experience was repeated in the run to Iceland, and again in that from Iceland to Hammerfest, and it was only after sighting Bear Island that our first encounter with the frozen fields took place in latitude  $74^{\circ}$ . This too after we had heard at all points the most discouraging rumors of the immense amount of ice in the North Atlantic. Before sighting the ice which surrounded Bear Island, the ice-glimpse, ice-blink or ice-sky was pointed out by the pilot, a peculiar hard white appearance of the sky close to the horizon, which enabled him to say that ice was there long before it made its appearance. This blink seems like many other sea signs, to be by no means infallible. Many discussions in regard to it, in its very presence, were held on deck by the officers. The peculiar appearance of the sky was at times noted all around the horizon, when it was known that there was no ice in certain directions, and again it failed to put in an appearance, and the ice proper was suddenly discovered close aboard. While running along the ice-pack in daylight the ice-sky would be seen and noted by all hands, and the breaks of open water in the pack would be shown by a darker watery appearance directly above them. In foggy weather it assumes a more luminous appearance, visible a half mile perhaps, and resembles very much a greatly subdued electric light. It is not marked by any scintillations, as might be expected if it were caused by reflection, and is probably the effect produced by the ice upon the temperature of the air immediately over it.

Fortunately, Bear or Cherry Island was sighted in clear and pleasant weather. The ice was found first low and somewhat broken, extending about three miles from the land to the southward, and to the east and west as far as the eye could reach. The sea was smooth, but on entering the loose ice, a considerable increase of swell was noticed, a thing said by the pilot to be almost always found. The ship stood in toward the land as far as was consistent with the orders, and an effort was made to find a lead and make a landing on the island. The locality in which Nordenskiöld had left a tide-mark in 1864 being well described, it was hoped that a measurement might be made and another mark left near the same place, but no lead could be found. After lying off and on for eighteen hours, the ship was again forced



into the ice as far as possible in a different stage of the tide. The condition of the ice had greatly changed in the interval, miles of it having disappeared. We ran within two miles of the southern end of the island, and although the ice-limit to the eastward remained unchanged, that to the westward was not more than five miles away, while the day before it could not be seen from the crow's nest. The ice appeared loose about the southern end as on the previous day, but as the swell was much heavier, it was not considered advisable to send a boat in, and after heaving to, firing guns and making signals to attract the attention of any chance castaway, we finally left Bear Island to its magnificent solitude. It is a remarkably steep and dreary snow-capped island, with a mountain appropriately named Mount Misery at the southern extremity. There are said to be two tolerably good harbors, and coal is found in several places. It was formerly a great resort for walrus and bear hunters and fishermen, but of late years it seems to have been absolutely deserted by both man and beast.

Standing to the northward on the 1st of August, we met a small fishing boat, which had been in the neighborhood for two weeks, awaiting an opportunity to get north. Our course was consequently shaped more to the westward, and we were very much surprised to find the track completely clear, with no signs of ice whatever. The next day Mt. Hornsund appeared about seventy-five miles distant, and we stood more to the eastward in order to make Bel Sund. It is said under favorable circumstances Bear Island is not lost sight of until Mt. Hornsund is made, and this probably accounts for the dislike of the fishermen to run their vessels to the westward and so avoid the ice, which remains much later in the area directly between the two, than it does further to the westward. Mt. Hornsund, with its pinnacled snow-clad summit towering high in the air, presented a beautiful sight. It is situated on the southern extremity of Spitzbergen, and about 140 miles north of Bear Island, serving as a landmark for the fishermen, who wait for days to get a sight of it and thus learn of their whereabouts. Continuing our course, we stood into Bel Sund on the forenoon of the 3d against a heavy easterly gale, blowing directly out, finding large quantities of ice. Recherche Harbor was completely closed. We communicated with two fishing boats found anchored close to the shore, tolerably well protected, but deeming it unadvisable to remain, as the ice would probably start out under the influence of the strong wind, we continued on our way up the coast, running into Ice Fiord and Green Harbor early the following



morning. In attempting to make the run under sail, we found, immediately after getting to the northward of the entrance to Bel Sund, that the wind died out almost instantly, the line of demarcation being plainly visible on the water later, and the conclusion was formed that the gale was local. Green Harbor was found clear, to the hanging glacier at its lower extremity, and quite a fleet of fishing vessels, one of which was a steamer, were lying quietly at anchor near the eastern shore, about half way down the bay near the mouth of quite a large stream of fresh water. Communicating with the fishermen, we heard very discouraging reports. An English excursion steamer, the *Pallas*, had left that morning on her return, driven back by the ice, which had been found close down on the northwest extremity of Spitzbergen, and the *Forsog*, the fishing steamer mentioned, had also been driven back to this harbor on account of the low condition of the ice, which prevented her taking the usual fishing station to the northward. Green Harbor is very different in appearance from the bleak cliffs outside in the fiord, and merits its name, the rocky mountain sides appearing to be covered with a green moss, which at a distance might be taken for grass. Some few stunted grasses were found there, among them the scurvy grass and a few small colored flowers like violets.

In this locality were also found some twenty or thirty graves, an ordinary wooden headboard of one bearing date of 1709. It was quite a relief to see such a number of vessels and so many human beings in a place which we had been led to believe was inaccessible. We met many of the fishermen, although our interchange of sentiment was somewhat limited on account of the difference of language, but were quite agreeably surprised to find that three of these Norwegian masters could speak tolerable English. We procured from them our first wild reindeer venison, some eider duck eggs, and all the codfish wanted.

Remaining one night, we left Green Harbor August 5, early in the morning, and stood across to Safe Havn in Ice Fiord, directly opposite. This bay, recommended as a good anchorage, was found full of ice, but a boat was lowered and sent in to search for a tide-mark left by Nordenskiöld on a small island at the southeast extremity. The accessible sides of this island were carefully searched and the boat was dragged some distance over and among the floating ice near it, but no mark was found. A copper plate with the ship's name and the date was secured in a partially sheltered niche on the

southeast face of the island, nine feet above low water, but from the crumbling character of the rock it is very doubtful how long it will remain.

Standing out and to the northward, Hakluyt's Headland was made the following noon. Although at no time on the way up was the coast nearer than twenty miles, it did not appear five miles away, and the bleak high cliffs were raised by refraction more than a third of their height, so that their bases seemed to be set in an immense mirror. Pushing as far north as possible, the commanding officer in the crow's nest selecting the leads through the ice, which was found moving opposite the seven ice-mountains and Magdalena Bay, a way was threaded to the northward and westward to a latitude of  $80^{\circ} 01' N$ .

Further progress was impracticable, the ice stretching away to the northward, westward, and eastward, in cold bleak fields close covered by the hard steely ice-sky, without a darker spot to show the presence of open water. The ship remained in this position for nearly two hours taking soundings, 282 fathoms, making observations for position by Sumner's method, and collecting specimens from the floating ice. Thinking it might be our only opportunity to get north, all felt very proud of the ship's achievement in crossing the 80th parallel. Afterwards we passed along the edge of the pack to the westward, and on the following day stood to the eastward, running close to the shore of Amsterdam Island. Here also was noted a remarkable disappearance of the ice; all that which had been moving down the coast as far south as the seven ice-mountains had entirely disappeared, as had also our open water to the northward, and solid masses of ice appeared close down to the Smeerenberg. Any attempt to get to the northward or eastward was consequently impracticable, and after sounding and dredging in the vicinity the ship ran in and came to anchor in Bjoren Bay, South Gat, on the 7th August, to await a more favorable condition of the ice, and to enable the officers to make the collection of specimens ordered. One very exciting incident here was the white bear hunt.

Full moon occurring August 10, Mr. Schwenk and myself left with a party in the whale-boat to establish a bench mark on Hakluyt's Headland, the northwestern point of Amsterdam Island, about fifteen miles from the ship's anchorage. Away about thirty hours, rainy and foggy all the time and a gale from the southwest, with heavy seas on our return, it was a trip long to be remembered. On our arrival at

the headland no ice was in sight except in the Smeerenberg, but as the weather was thick our limit of vision was not greater at any time than ten miles ; but during our short stay we were afforded another opportunity of noting the remarkable movement of the ice with no visible cause, there being no wind. After having marked high water, while searching for a place to leave the upper mark, I cast a glance to the northward and the ice was plainly visible. Raised by refraction it seemed much higher than any before observed, and was moving rapidly towards us. Watching it carefully, I was first under the impression that it would be prudent to start on our return at once, but disliking to give up the work only half done, I waited, and finally had the satisfaction of seeing it move away as rapidly as it came, disappearing suddenly in the same mysterious way. We determined the establishment of the port, the rise and fall of the tide, took dip observations and established the bench mark on a huge boulder in the middle of the bay, just to the west of Hakluyt's Headland, known to the pilot as Amsterdam Bugt. It consisted of a copper plate secured as firmly as possible to the boulder, marked with ship's name and date, eleven feet above low water, and this mark was carried up the cliff on the west side of the headland by means of the tide staff and a deal of hard scrambling on the part of Mr. Schwenk and myself to a point one hundred and eighty-four feet above low water, where a composition spike was driven, and the ship's name and date were painted on a natural tablet close by.

On the 12th August another attempt was made to get to the northward and eastward with the ship, but the ice was found close-packed and impenetrable to the north end of the Vogelsang, so we stood to the southward and westward, making traverses in obedience to orders, closely examining the ice for evidences of any living beings, and locating and charting its limits, standing back to the northward and lying close to the ice the 18th and 19th. On the 20th we found the ice well back and weather good, and on that day made the highest latitude  $80^{\circ} 10'$ , longitude  $11^{\circ} 20' E$ . Continuing along the edge of the ice from this point to the southward, we reached longitude  $13^{\circ} 15' E$ ., in the vicinity of Biscayen Huk, when the ice-pack reached the land, forming an impenetrable barrier. We sighted Welcome Point and Verleggen Huk, and on the run west stood down to make out the two Norways, and then directly west, clearing the land none too soon, as we had to pass close along the edge of the ice-pack, which had moved ten miles south during our trip to the eastward.

Continuing the traverses until the 24th, we ran over to Green Harbor to see if it were possible to replenish our coal supply, which was running rather low. We tried to obtain some from the Forsog on the eve of sailing, but as her master had none to spare, an expedition in charge of Lieutenant West was sent on shore as a mining party. About four tons of good bituminous coal were procured, and as this was two days' supply to the ship for heating purposes, the trip to the harbor was not considered a failure. The coal was taken out of a seam about two feet deep, dipping fifteen degrees along the face of the cliff, which formed the eastern bank of the bay. The supply appeared to be unlimited, but no more could be obtained for lack of mining tools. In carrying out the orders of the Department, the coal question was a very serious one. Although the winds were light and unreliable throughout the entire trip, considerable distance was made in the traverses under sail. Considering the fact that it required an expenditure of more than two and a half tons daily for heating and distilling, and that being constantly in the vicinity of the ice it was necessary to keep steam in a comparative state of readiness; the fact that the Alliance remained 50 days upon this trip on an expenditure of 160 tons of coal, is an evidence of the careful consideration and close calculation of the problem by the commanding officer.

Finding it impossible to increase our coal supply, we left Green Harbor, and stood to the southward and westward, continuing the traverses. We determined the ice-limit in  $77^{\circ}$  N., and standing back to the eastward, weathered Bear Island in a gale of wind with thick weather, passing within six miles of the island without catching a glimpse of it, and then stood again to the westward as far as  $8^{\circ}$  E. Upon reaching the limit of steaming distance with the coal on hand, the ship was headed for Hammerfest, where we arrived on the 11th September. Some anxiety had been felt on our account in Hammerfest, and attempts were made to dissuade the commander from returning, but after nearly exhausting the supply of coal at Hammerfest, the vessel started again to the northward on the 16th. It should be remembered that the first trip north had been made in daylight, our side-lights being used for the first time when weathering Bear Island on the return, and this gave a certain comparative feeling of safety, for dangers could, under such circumstances, be seen in time to be avoided. On the second trip, however, night was coming on, and coming on rapidly. When it is considered that, at our position on the 22d September, in latitude  $79^{\circ}$  N., the meridian altitude of



the sun was only  $11^{\circ}$ , that the wind was fitful and furious, that the temperature was getting lower and lower, that snow and sleet squalls were frequent, and that the movement of the ice to the southward of us was unknown, it cannot be wondered that great anxiety was felt. At that time we had obtained a glimpse of the entrance to Ice Fiord and seen Prince Charles Foreland very much changed in appearance, as it was completely covered with snow to the water's edge. On that day, the 22d, strong breezes from the northward and westward made it possible that the ice might be driven in close to the land, and our Captain's intention of proceeding to the northward until the ice should stop the way was almost given up. A favorable shift of the wind, however, to the southward and eastward afforded an opportunity to make still another effort, and it was not until long after dark, at about 6.30 P. M. on the night of the 23d, in a thick fog, with a sudden heavy squall of wind and snow from the north, that the idea of going further north was abandoned as unsafe and impracticable, and the vessel was headed to the southward and westward, in latitude  $79^{\circ} 03' N.$ , with the expectation of picking up the ice line to the westward near by and following it down as ordered. Continuing the course as shown by the chart, considerable surprise was felt at finding no ice; so when clear of the old track, the ship was headed more to the westward to find it. Certain that each hour must bring it to view, and unwilling to abandon the search, the ship was continued on her westerly way to longitude  $0^{\circ} 50' E.$ , when ice was reported close aboard on the port bow, unexpectedly trending nearly east and west. The ship was put about immediately and steamed along the ice full speed. The wind was from the southeast, increasing in force to a strong gale, with the weather very thick and foggy, with snow and sleet squalls, but with no sea. This was an occasion upon which the ice-blink was our salvation. Running as fast as possible, changing our course only on the warning of this luminous light, headed off on all easterly courses, so that at one time we were heading true WNW., we managed finally to work our way out of this pocket or opening in the ice at nearly the same point, where twenty-four hours before we were supposed to have entered it. Shortly after a partial lifting of the fog showed us the limitless ice-pack in different points, moving very rapidly to the north under the influence of the strong southerly gale. An hour of awe-inspiring suspense was that from six to seven P. M. of the 25th September. All hands were on deck, the Captain upon the forecastle peering out into the darkness and storm, the fog so

thick that it could be felt, the ship and rigging completely covered with ice and snow, which served to mark out her shape in the black night with a luminous ghastly light, contending with an unseen danger of whose limits nothing was known.

I shall never forget the intensity of feeling caused by the almost constant repetition of the command "starboard," "starboard," as the spectral ice-glimpse would suddenly appear directly ahead, knowing that each spoke of the wheel was sending us farther away from the open water and safety. Indeed when running WNW. hope seemed left behind. The revival of hope, the eager expectancy, the revulsion of feelings, as "port," "port," "port" was successively heard, and finally the sense of security when the ship dipped her nose nearly bows under in the heavy open sea, have left an impression upon the minds of all on board never to be effaced. A closing of the ice upon us that night would have probably been fatal and added another to the long list of Arctic disasters, which, in point of numbers, would have been greater than any before. The ship was not in any way fitted for an encounter with the ice, the nearest land, desolate Spitzbergen, was two hundred miles away, and Hammerfest, the nearest port, was over seven hundred miles distant, almost dead to windward; so, had the ship been nipped, she and her whole complement of one hundred and eighty men would have disappeared from the face of the earth without ever making a sign.

After our lucky escape the course was continued to the southward, keeping constantly in cold water, weather thick and foggy, and never probably far from the ice. The next encounter with it was on the morning of the 28th, latitude  $74^{\circ} 30'$  N. Upon this occasion the ice-glimpse did not appear, and we were running in among small ice pieces; at two o'clock A. M., before there was any warning, stopping the engines, the sound of the sea upon the ice could be plainly and loudly heard to the southward and westward like the roar of a surf not more than 300 yards away. The ship was headed to the northward of east, and stretching along slowly we located the ice line as charted. On the following day, one of the very few pleasant ones experienced, we sighted the ice-sky plainly; after that, the trip to the southward was passed in an almost continuous gale from the SW., dead abreast, occasionally lulling, but generally blowing with force of eight. With the coal nearly exhausted, in a ship with no weatherly qualities whatever, it seemed that our only chance lay in standing to the eastward for the coast of Norway, it being doubtful whether we



could pass to the northward of Iceland on account of the low condition of the ice. Thanks to the "sweet little cherub that sits up aloft," we managed in one of the comparative lulls to make the NE. coast of Iceland, and communicated with some fishing vessels, and the steamer *Nord Kap*, hearing from them that under the lee of this island the weather had been pleasant, with little or no wind for the whole month, and that the ice was nowhere near the north coast. It was concluded, therefore, to make the passage to the north; and as long as we remained north of Iceland we had a respite, but immediately on running out from under the lee to the west we met a tremendous gale from SW., lasting twenty-four hours, more furious than any before. Taking advantage of the lull following this gale, no time was lost, and no extra distance run in making an anchorage in the Faxa Bugt, six miles from Reikiavik, on the night of October 9. In all these heavy blows to the northward, and off the coast of Iceland, it was particularly noticeable how rapidly the sea would rise upon the increase of wind, and how rapidly it would fall in the lulls, showing that the winds must be local, although constantly from the same direction. While standing down the coast of Iceland after the gale, in smooth water, when off the north entrance of the Brede Bugt, we ran into a whirlpool or tide-rip. The water commenced to pour over the side, and the ship took up an uneasy heavy twisting motion, which very soon caused her head to be put straight off shore.

The following morning, October 10, we ran into the same anchorage we left three months before off Reikiavik, having made in the meantime without loss or accident of any kind, fortunate to the very end, a cruise in the frozen Arctic Ocean.

#### THE ICE.

The ice encountered throughout the cruise was low, generally from six to ten feet out of water, never higher than twenty-five feet. Occasionally when running towards the pack or skirting it, large detached high pieces would appear on the horizon, but on approaching, after running a much longer distance than was apparently necessary, they would grow gradually less, and finally merge into the solid, almost level field, the high appearance being caused by peculiar atmospheric conditions upon the upturned and overlapping edges of the floes.

Upon one occasion, no ice in sight, we made what appeared to be a considerable fleet of fishing vessels on the horizon, and ran down to

communicate, only to find ourselves some hours later alongside the low and apparently level ice-pack. The loose ice into which the vessel was driven was generally white, water-eaten and snow-like. Upon encountering the bluish-green ice, she was immediately headed off, as the latter is as hard as a rock, and its shape beneath the surface very doubtful, so that in attempting to avoid that portion in sight, the ship might be stove under water. While at anchor in South Gat, we had some experience with the glacial ice, which was heard breaking from the faces of the glaciers with a tremendous boom, and as it went floating by it was a source of considerable anxiety. A peculiarity of this anchorage under the lee of a small island, called Moff Island, was the fact that quantities of ice came floating down through the Gat and instead of going to sea, would circle round the island and attack the ship again from the smaller channel.

In the vicinity of the ice, seals were occasionally seen, large numbers of sea-fowl were encountered, attracted by the jelly fish and whale feed with which the water was teeming, and the cliffs of Spitzbergen seemed alive with the auks, puffins, gulls, loons, rotges, eider ducks and other arctic birds.

#### CURRENTS.

During the entire cruise the currents were most treacherous and difficult to determine. Setting out from Hampton Roads, just clear of the capes we struck into a large body of warm water some twenty or twenty-five miles across, and lost the southerly set expected. The Gulf Stream was found further to eastward than usual, and we experienced its full force to the southward of the Banks of Newfoundland, setting ENE. more than two knots an hour. Rounding Cape Race to make St. Johns, the southerly current there of one knot given on all the charts and mentioned in the sailing directions, was not found at all, but on the passage out we did find a southerly current, though very much less in force. Later, during the run to Reikiavik, we should have had northerly currents, according to the charts; on the contrary, all were to the southward, and it was not until making the southwest coast of Iceland that we encountered a heavy NW. set.

Crossing from Iceland to Norway, the Gulf Stream did not put in a showing by current in any case, nor did it on the trip to the northward from Hammerfest, the currents in those parts of the Atlantic being generally to the westward, with some southing. After reaching the coast of Spitzbergen, we found a northerly current when near the coast and a southerly one when near the ice to the westward.

On setting out to the southward, September 26, 27, and 28, in the vicinity of the ice, we found the most surprising current. In cold water, which in connection with our previous experience led us to believe the ship in a southerly set, we found that in an interval of four days between observations we had drifted to the northward sixty miles. Making the northern coast of Iceland, the flow of water was treacherous and very dangerous.

From Iceland to Halifax, in October, the currents were found nearly the same in force and direction as those determined on the passage up in July, excepting off Cape Race, where we were set to the southward by a heavy current, finding the ship in the vicinity of the Virgin Rocks after a heavy blow from the northward and westward, and the next afternoon we had drifted to the northward up off the entrance to St. Johns in a heavy southwest gale. On our own coast, during the run down, the currents were very carefully watched and found *not* to correspond generally with those given on the charts, so that I am led to believe that these currents are affected almost immediately and to a remarkable degree by the existing winds.

All the currents recorded during the cruise were determined, using the distances run by patent log, as it was found impossible to make the runs by deck and patent log correspond, although a great deal of attention was given to both, the patent log generally registering more than the other. In running known distances off Fortress Monroe and along the coasts of Iceland and Newfoundland, the patent log checked very well, and it was considered advisable to use its registered distances in preference to the other, as even if it did over-run, as is possible, the currents shown would be relative in value.

#### THE CHRONOMETERS.

Previous to leaving Norfolk the daily rate determined for the standard was 0.2 sec. gaining, the average temperature for the ten days having been 76° F. As a decrease in the reading of the thermometer was anticipated upon going to sea, 0.5 sec. was assumed for the rate, and on reaching St. Johns, Newfoundland, it was found to have been 0.6 sec. gaining daily for the preceding eleven days, during the run from Norfolk to St. Johns, the average temperature having been 71°.

On setting out for Reikiavik, anticipating a further decrease in temperature, 1 sec. was assumed for the daily rate. It was impossible to obtain observations during our stay in Iceland, therefore this same rate was carried on until reaching Hammerfest, the average tempera-

ture during the entire trip remaining  $61^{\circ}$ . By observations at this latter port, the rate for the twenty-nine days occupied in making the trip was found to have been 1.3 sec. gaining. In working up the observations, however, the rate of 1 sec. was found by comparison with the two accompanying chronometers to have been correct up to the time of leaving Reikiavik, and so the error obtained at Hammerfest was used with that computed at Reikiavik, and the rate for the preceding twelve days became 1.5 sec. gaining.

With this rate, 1.5 sec. gaining, the cruise in the Arctic was commenced. Running along with the other chronometers and their given rates, this seemed to be justified, and the greatest confidence was felt until about September 1, when there seemed to be a slacking up of the standard, and later of the other two chronometers in an average temperature of  $59^{\circ}$  for the thirty-five days preceding. The assumed rate was accordingly reduced, and on reaching Hammerfest it was found that the rate for the fifty-one days from that port had been but 0.7 sec. gaining, the average temperature for the whole time having been  $60^{\circ}$ . The error used was less than 30 sec. different from that afterward determined; a serious error in ordinary latitudes, but amounting to little more than one mile in actual distance there, and consequently of but little importance. On the run north again from Hammerfest and to Reikiavik, with a lower average temperature than any before,  $58^{\circ}$ , the rates continued decreasing, and that of the standard determined at Reikiavik, October 12, for the preceding twenty-eight days was 0.4 sec. losing. Twenty-four days later, at Halifax, the rate for that number of days was determined to have been 0.13 sec. losing daily, average temperature  $61^{\circ}$ , and since that the standard has been running very regularly with practically no rate.

In the determination of these rates, the short time of stay in any port and the general cloudiness of the weather prevented the following of the usual methods, and observations were made under as nearly the same conditions as possible, using the chart longitude for the chronometer error at the several ports, and each was compared with that obtained last preceding. By careful attention paid to the thermometer and to the comparative rates of the three chronometers, any marked change in the somewhat erratic rate of the standard was generally discovered, and the greatest difference noted between error used and error determined was that already mentioned of 28 sec. after a sea voyage of forty-four days, when the decrease in rate was exactly contrary to the change anticipated. I append a table showing the

errors and rates of the three chronometers, together with the error used in the last observations made before entering the port. It will be seen that Chronometer B ran with a smaller and more regular rate than either of the others.

	Chronometer A.			Chronometer B.		Chronometer C.		Average Temp.
	Error fast.	Error last used in making port.	Rate.	Error fast.	Rate.	Error slow.	Rate.	
June 15, Norfolk.	sec. 3.4		sec. + 0.2	m. sec. 4.38.4	+ 0.05	m. sec. 9.10.6	- 0.9	76°
June 26, St. Johns.	10.0	June 23, 8.0	+ 0.6	4.40.5	+ 0.2	9.19	- 0.8	71°
July 13, Reikiavik.	27.0	July 9, 18.0	+ 1.0	4.43.9	+ 0.4	9.36	- 1.0	61°
July 25, Hammerfest.	46.1	July 24, 38.0	+ 1.5	4.48.1	+ 0.4	9.47.4	- 1.0	61°
Sep. 14, Hammerfest.	81.3	Sept. 10, 110.0	+ 0.7	4.52.3	+ 0.1	11.04.2	- 1.5	{ 59° 61°
Oct. 12, Reikiavik.	69.8	Oct. 9, 82.0	- 0.4	4.49.3	- 0.1	11.51.2	- 1.7	58.5°
Nov. 5, Halifax.	66.5	Oct. 30, 72.0	- 0.13	4.51.3	+ 0.1	12.21.2	- 1.25	60.5°

## COMPASSES.

By far the most difficult thing to understand during the voyage was the compass. By special orders from the Department the ship was to be swung, steaming in circles, both to starboard and to port, using the sun's azimuth, and in each case this was done, thus giving two deviation curves, the mean of which was taken for the deviation table. In Hampton Roads, before setting out, the deviation was found to be practically the same with both helms, greatest at points E. by S. and W. by N., about a point and a quarter. Off St. Johns, Newfoundland, a slight difference was noticed in the two curves, and an increase in the mean deviation (greatest at same points E. by S. and W. by N.) to a point and three-quarters. During the run thence to Iceland, great discrepancies were found in the deviation table and the charted variation, so that all courses were determined by azimuths. On swinging ship off Reikiavik, good reason was found for the discrepancies, for, using the charted variation, the easterly deviation was found to have increased more than a point (13°). Upon determining the variation later, it was found to be 8° less than that given on the chart; and using that, the mean deviation was found to have increased, being greatest on same points to rather more than two



points, the greatest difference between the two curves with the different helms being one-half point. In making the run to the coast of Norway, the deviation table determined with the charted variation was used, in order to avoid the necessity of correcting the chart; great care was taken, as the previous experience of change in both deviation and variation led to an expectation of further and greater change in both. It was noticed, however, that the tables acted very well, giving good results; and on swinging ship off Hammerfest, it was found that the deviation had not changed, the mean curves determined at Reikiavik and Hammerfest being almost identical, the difference between the curves with the two helms also remaining the same.

Swinging ship again off Hakluyt's Headland, Spitzbergen, latitude  $79^{\circ} 50' N.$ , the difference between the curves with the two helms was found to be rather more than a point, and the greatest mean deviation on the same points, E. by S. and W. by N., three points and three-quarters.

During the cruise in the Arctic great difficulty was experienced in keeping the ship on any course, as in a sea-way the compasses would swing from the motion of the ship frequently as much as eight points. The standard compass, at a greater elevation than the others, was more affected by this motion, and being a liquid compass seemed to maintain the swing longer. An admiralty dry compass was mounted in the starboard binnacle, and this, compensated for dip, did not seem so much affected as the others, though still very lively. The experiment of placing a circular piece of iron under this compass, as recommended by Parry in 1827, was tried, and, whatever the reason, it obviated a great deal of the swing, enabling the quartermasters to keep tolerably near a given course, although even this compass would swing a point and sometimes two.

A marked effect of the land on the compasses was noticed while skirting along the southern coast of Iceland, and, indeed, whenever near any part of that coast. Also near Spitzbergen, a marked instance of which was noted in steaming across Ice Fiord from Safe Havn. In clear weather the ship was headed about W. by S. true, to run some two miles outside of the southern cape of the fiord, ten miles distant. The ship being properly pointed, the apparent compass course was given the quartermasters to run by, and great confidence was felt, notwithstanding that a very dense fog soon shut out all vestiges of the land. An hour later came the somewhat startling



cry, "Land ahead and on both bows." A lucky lifting of the fog showed that steering the noted compass course the ship was running directly for the land, two miles inside the cape, instead of two miles outside, as she had been pointed when the course had been read and given. I have since seen a suggestion that the compass is affected by the fog; whether it was so in this case, whether it was the land, or whether it was a tidal current, it is impossible for me to say, possibly a combination of the three. Another remarkable incident in this locality is the fact that the standard and the dry compasses differed from each other by six points, running into Green Harbor on the southern side of the fiord, this difference disappearing after coming to anchor, not quickly as if either of the compasses had stuck, but gradually. The variation was found different from that given on the charts in all cases, and from these experiences it can readily be understood that the ship was kept well clear of land, except in fair weather, and that courses were always laid by azimuth or bearings. The following table shows at a glance the changes in deviation, together with the dip and variation as determined:

		Greatest Deviation Pts. E. by S. and W. by N.	Variation as determined.	Dip of Needle determined.
Norfolk.	Lat. 37° N.	14°	3° 19' W.	...
St. Johns.	Lat. 48° N.	18°	30° 28' W.	74°
Reikiavik.	Lat. 64° N.	23°	36° 57' W.	75°
Hammerfest.	Lat. 71° N.	23°	4° 15' W.	76°
Haklyut's Head.	Lat. 80° N.	41°	18° 20' W.	81°

## OBSERVATIONS.

In such high latitudes, and under such unusual weather conditions, observations required the utmost care and almost constant attention. The frequency of fog, the generally overcast sky, the slow motion in altitude of the sun, the varying condition of the atmosphere and consequent changes in dip and refraction, were unusual difficulties with which to contend. The proportion of clear sky for the entire month of August was but two-tenths, and for September less than one-tenth,

while the weather was foggy one-quarter of that interval of two months. The motion of the sun in altitude on the 6th August, latitude  $80^{\circ}$  N., was when observations for time were possible, but  $3'$  in 1 min. of time, and in September, but  $1'$  in 1 min. of time, and altitudes for latitude could be taken at any time within a half-hour of meridian, as the change in altitude then was very slight. A compensation for the possible errors in time observations was the fact that in  $80^{\circ}$  latitude, a degree of longitude, or an error of 4 minutes in time, was but 10.4 miles. During nearly the entire month of August the sun did not go below the horizon, yet there were opportunities for but two observations for lower meridian altitude, one of which I obtained on the night of August 3, the altitude being  $4^{\circ} 34'$  in latitude  $77^{\circ}$  N. Changes in the apparent horizon from varying dip and refraction were remarkable. Upon one occasion while taking a meridian altitude the apparent horizon changed the entire diameter of the sun, so that what had been an altitude of the lower limb, became an altitude of the upper, due in this case to a squall passing between the ship and the horizon, although the horizon was seen perfectly distinct through it. Another noted incident, where three observers were measuring altitudes near meridian, each observer's altitude differed by  $7'$  for some considerable length of time before noon, all agreeing later, however, upon the meridian altitude. Under such circumstances a great many observations were necessary, and those were thrown out which attendant conditions rendered doubtful.

Dip and refraction were always corrected for temperature and barometer, and good results were obtained so far as known. The sun appeared very much like a ball of cotton in the higher latitudes, and although it was daylight all the time, it was never bright and cheery like the day in our own latitudes, but a dull, dark, unsatisfactory and gloomy light, which was rather depressing at all times. Observations for dip with a Barrow dip-circle were made when practicable.

The barometer in its action was anomalous. We experienced gales of wind with a high barometer, and gales of wind with a low barometer. The barometer fell to 28.90 with no noted change in the weather, and we had a strong gale of wind from off Bear Island, with barometer at 30.20. These and numerous other singular actions led us to have but little faith in its indications. The average height of the barometer in the Arctic north of  $70^{\circ}$  latitude during August and September was 30.01, highest 30.44, lowest 29.45.

Temperatures were unexpectedly high for such latitudes, the lowest

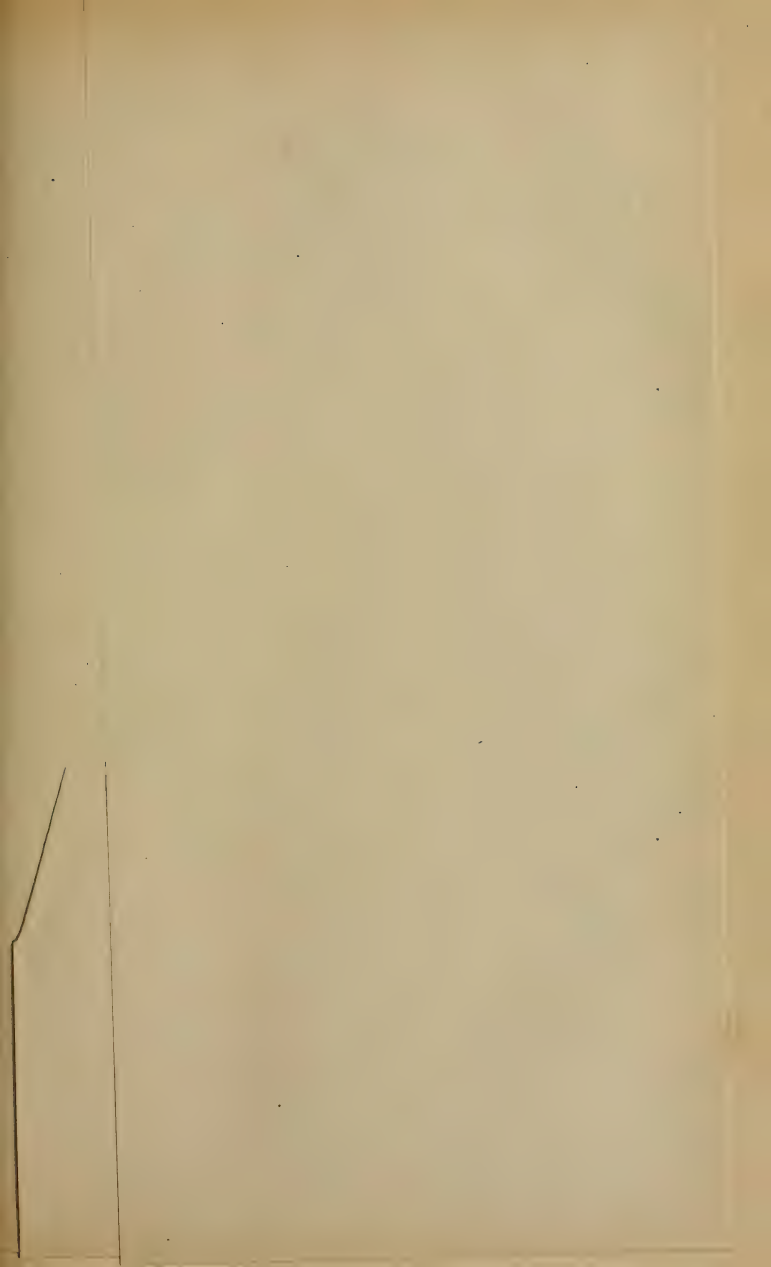
reading of the air thermometer being  $20^{\circ}$  above zero and that in latitude  $78^{\circ}$  N., in September. The average temperature for August and September was  $39^{\circ}$ , and the highest temperature,  $51^{\circ}$ , was noted one day, August 4, at Green Harbor, latitude  $78^{\circ}$  N., and one other day, September 13, at Hammerfest, Norway, latitude  $71^{\circ}$  N. The lowest noted surface-water temperature was  $30^{\circ}$ , when close to the ice, but the average temperature was above  $32^{\circ}$ , excepting for one day when the ship was in the ice pocket, September 25, the mean temperature for that 24 hours having been  $31.5^{\circ}$ .

Water temperatures at 5 and 10 fathoms, and specific gravities of the sea-water at surface and 10 fathoms below, were constantly taken and recorded, though the differences were generally very slight. Specimens from the shore and the sea were collected, and the usual ship's meteorological observations were made with the greatest care.

Whatever may have been thought of the advisability of sending the Alliance into these waters in search of the Jeannette, subsequent events seem to have shown the wisdom of the proceeding, if for no other reason than that of the general knowledge of the polar basin, to be obtained by simultaneous observations of the ice at the two great entrances of the Arctic Ocean, by the Rodgers and Corwin on the one side, and by the Alliance on the other. In the Atlantic, during the months of August and September, in the vicinity of the 80th parallel, we found the ice lower than it has been known before for forty years; the average temperature of the air was about  $40^{\circ}$ , and that of the water was never below  $32^{\circ}$ ; snow and ice were melting on the land near by, forming huge streams down the mountain's sides, and pools of water could be seen on the floating ice, so that it is safe to assume that miles of this ice were daily disappearing, though constantly being replaced by other ice from the northward, giving evidence of a strong southerly current in this locality from the Arctic to the Atlantic, and corroborating the evidence of Parry to the same effect in 1827. With such a tremendous current here, a corresponding northerly set must be found somewhere, and when news was heard from the Corwin and Rodgers, of a strong northwest current to the northward of Wrangell Land, it was surmised that it formed a part of this great current sweeping through the Arctic Ocean in the same general direction as that taken by all great ocean currents, that is to say, with the hands of a watch. Further, on hearing that Wrangell Land had been circumnavigated, and that the ice was higher on that

side than ever known before, it was supposed that, whether exceptional or not, the current had been strong enough to move the entire ice-pack, so that the conclusion arrived at in regard to the *Jeannette* was that, probably fast in the ice, she had been drifted to the northward and westward, and her long silence was considered a good augury of great success in reaching a very high latitude, if not the pole itself. Moreover, Franz Josef Land is the nearest land to the pole so far as known, and with a favorable current setting northward, so that strong hopes were entertained that some tidings might be heard on the return of Mr. Leigh Smith from his summer cruise in that region.

Later news of the loss of the *Jeannette* in latitude  $77^{\circ}$  N. and  $165^{\circ}$  E. affords some support to the theory of this northwest current, and the length of time taken by her ship's company to reach land affords still more. Comparing their journey with that of Parry in 1827, it seems evident that they must have had a heavy current to contend with. Parry set out in June to sledge north from Spitzbergen, taking two boats and sledges with twenty-eight men, and with great difficulty made 292 miles by water and over the ice in thirty-one days, but the actual distance made good was only 172 miles, owing to the strong southerly current, which he found to increase greatly in force as he pushed further to the northward. In his report he says that the greatest difficulty was found in getting over the broken ice at the edge of the pack, and that the ice became more and more practicable as he increased the distance from the edge, so that he was able to make from twelve to fifteen miles a day. Unfortunately, this distance was all taken up by the drift of the pack to the southward, so that his highest latitude was  $82^{\circ} 45'$  N. The return was made in twenty-five days, a much longer time than was expected, owing to the fact that in the latter part of July and in August the ice became very soft and almost impracticable, so that the return seems to have been made almost wholly by the drift of the pack. Considering that the *Jeannette* party were working for their lives at the same season of the year, they must certainly have made as great a distance daily as did Parry, and the great length of time consumed in making 300 miles, the shortest distance from the scene of the wreck to the mainland, seems to show conclusively the fact that they experienced a very heavy set to the northward. The distance of the *Jeannette*, when lost, from Franz Josef Land was 900 miles, and I venture to say that the party would have made this distance, assisted by the current, in the same length of time, if not less. It is quite pos-





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80°N

# **TRACK CHART** **U. S. S. ALLIANCE** **1881.**

- a. Seven ice mountains.
- b. Amsterdam Id.
- c. Vogels ang
- d. Smeerenberg
- e. Recherche Harbor.

78°

76°

74°

10°E

20°

80°

78°

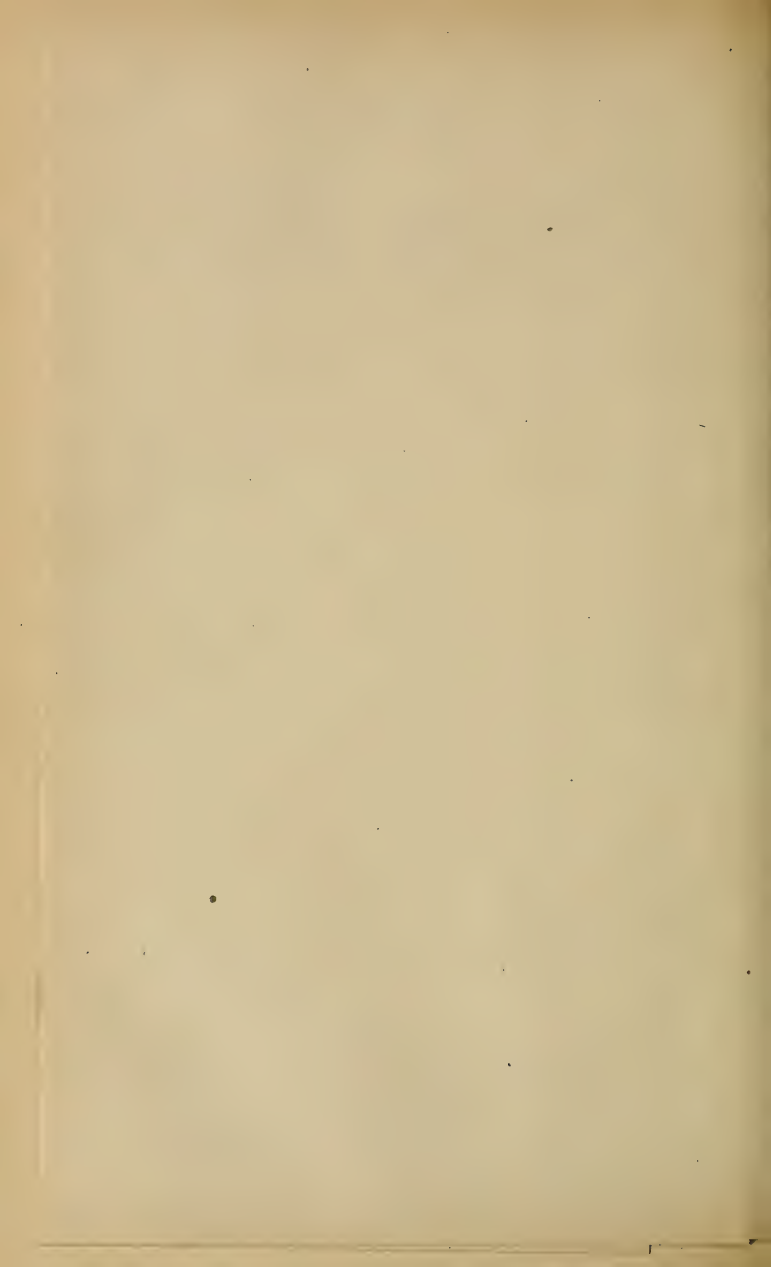
76°

74°

10°

20°





sible that this route of return may have been considered by De Long, but given up on account of the uncertainty of finding any assistance in that desolate land. All this is a matter of conjecture, which will be settled on hearing the story of our brave and gallant fellow-officers.

The impracticability of reaching the pole with a vessel seems to have been proven beyond a doubt. From our experience in the smooth water under the lee of the ice, during the gale of wind on the 25th September, the theory of an open polar sea seems untenable. Had the temperature been low enough the water would certainly have frozen, so far as its motion was concerned, for it was perfectly smooth a distance of at least half a mile from the pack, and this half mile freezing and carrying on the smooth water, a short time would have sufficed to cover the entire sea. It appears that from uneven temperature, contraction and expansion take place, and that large openings do occur in the polar ice, which certain meteorological conditions may continue for considerable time during the summer; but these conditions are not permanent, and in the intense cold of the winter the still water must freeze, remain solid, become covered with snow, and the surface must be like that of a glacier, all the irregularities smoothed out, and a comparatively level, unbroken plain the result. Therefore I believe that if the pole is ever reached, it will be by sledging from the westward, striking directly across to Franz Josef Land, with no idea of retracing the route, and after a severe struggle with the broken ice at the edge of the pack, I believe the remainder of the route will be found a tolerably easy journey.



NAVAL INSTITUTE, ANNAPOLIS, MD.

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NOTES ON INTERCEPTING, CHASING, ETC.

BY LIEUTENANT H. O. RITTENHOUSE, U.S. N.

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PROBLEM OF INTERCEPTING.

The increased facilities enjoyed at present for collecting and issuing information regarding the movements, speed, coal capacity, etc., of steamers of all kinds, give additional interest and importance to the problem of intercepting a vessel or squadron while on its passage.

In dealing practically with questions of this kind we are often obliged to use estimates instead of the exact data desired, and the uncertain elements of wind, weather and sea will in general operate to render the result an approximation only. These facts make it the more necessary that the principles which underlie the subject, as it is presented under normal conditions of wind and sea, should be well understood, and that they may require modification to meet special circumstances argues nothing against their truth or importance.

It has been found convenient to distinguish between *Intercepting* and *Chasing*. In the former we consider the principles involved when neither vessel is trying to avoid the other; while by *Chasing* is understood the manœuvring and management adopted when a vessel is endeavoring to overtake or bring within range another which is trying to escape.

Two vessels are said to *intercept* each other when they reach simultaneously the point where their courses intersect.

The *problem of intercepting* may be stated as follows:

Given the *bearing* of the steamer *B* from the steamer *A*, the *course* and *speed* of *B*, and the speed of *A*; *required the course of A so as to intercept B.*

The problem may be solved by geometrical construction, and unless

the distances are very great, is sufficiently accurate when plotted upon an ordinary chart.

Let the line  $AC$  (Plate I., Fig. 1) represent the bearing of the two ships; and assume their positions respectively at  $A$  and  $B$ .

Let  $m$  be the rate of  $B$  in miles per hour,

and  $n$  " " " " " "

$BP$  making an angle  $\varphi$  with  $AC$  represents the course of  $B$ . It is required to find the angle  $\theta$  which determines the course  $AP$ .

Since the distances to be run by the two vessels are in the ratio of their speeds, we first find all the points (a curve) whose distances from  $A$  and  $B$  are in the ratio of  $n$  to  $m$ .

The points  $r$  and  $s$  are two such points found by dividing the distance  $AB$  internally and externally in the ratio of  $n$  to  $m$ ; and by geometry it is shown that the circumference described upon  $rs$  as a diameter contains all such points. Since the point of interception must lie on this circumference we have simply to mark the point  $P$  where it is met by the course  $BP$ ; then joining  $AP$ , we have the required angle  $\theta$  or course  $AP$ .

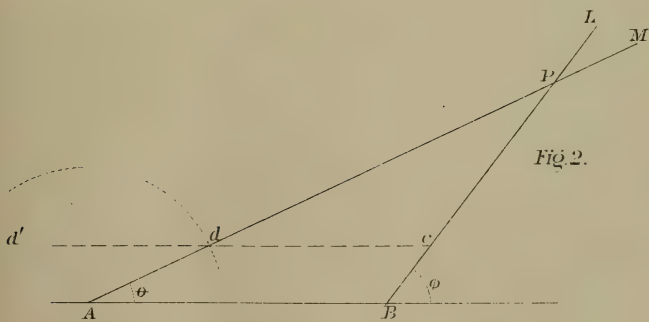
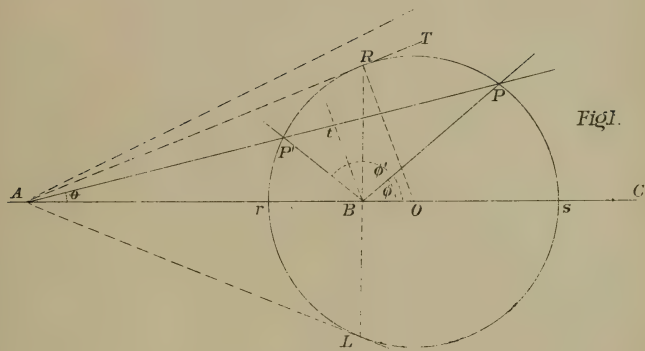
The figure is drawn to illustrate the case  $n$  greater than  $m$ , *i. e.* the speed of  $A$  greater than that of  $B$ ; and it is clearly seen that *whatever* course  $B$  may steer,  $A$  can intercept him.

If the course of  $A$  is known and  $B$  wishes to intercept  $A$ , the same construction gives the angle  $\varphi$  (two solutions  $\varphi$  and  $\varphi'$ ). In this case we see that  $B$  can intercept  $A$  whenever the course of the latter falls between the tangents  $AR$  and  $AL$ , (that is, crosses the circle), and that it is *impossible* for  $B$  to intercept  $A$  when the course of  $A$  does not cross the circle. Moreover, when it is possible for  $B$  to intercept  $A$ , it may be done by steering either of the two courses  $BP'$  or  $BP$ . These are the limiting directions for  $B$  to steer. If he should steer any course between them as  $Bt$ , he would reach the point of intersection before  $A$  and could there await his arrival.  $BP'$  makes the interception in the shortest possible time and  $BP$  in the longest possible time.

Thus  $B$  having a choice of courses would select that one which would best suit the particular circumstances of the occasion; for example, if he should wish to transfer stores or armament to  $A$  he would have more time to make the necessary preparations by taking the course  $BP$ , and might thereby not detain  $A$  so long as by taking the course  $BP'$ .



Plate I.





The points of tangency  $R$  and  $L$  are important, since they limit the directions by which interception may take place.

If the circle is already drawn,  $R$  and  $L$  may be found experimentally by laying a straight edge from  $A$  tangent to the circle.

The following method is preferable, however, since it also gives a ready construction for the circle.

At  $A$  lay off an angle with  $AC$  whose sine is  $\frac{m}{n}$ .  $AT$  is the required side. At  $B$  erect a perpendicular to  $AC$  meeting  $AT$  at  $R$ . Thus  $R$  is determined. (This is equivalent to constructing a right angled triangle whose base is  $AB$  and whose hypotenuse and perpendicular are in the ratio  $n$  to  $m$ .)

From  $R$  draw a perpendicular to  $AT$  meeting  $AC$  at  $O$ .

$O$  is the center and  $OR$  the radius of the circle.

As the problem presents itself *practically* there are two cases:

I.—*When the vessels are NOT in sight of each other.*

(Information regarding movements, etc., received from other sources.)

*1st Method.* Draw the circle and determine the course as explained above.

*2d Method.* Lay down the line of bearing  $AB$  (Plate I., Fig. 2). Assume the vessels at  $A$  and  $B$  any two points on the line. At  $B$  construct the angle  $\varphi$  giving the course  $BL$ . Take now equal multiples of  $m$  and  $n$  ( $4m$  and  $4n$  say) and lay off  $Bc = 4m$ . Through  $c$  draw a line parallel to  $AB$ . With center  $A$  and radius  $4n$  describe an arc cutting this parallel in  $d$ . The line  $Ad$  gives the required course or angle  $\theta$ . (The arc will cut the line in two points  $d$  and  $d'$ , but there can never be doubt in making the selection. If the arc does not touch the line, the slower vessel cannot intercept the other.)

*3d Method.* *Trigonometrically*, the course may be found from the formula  $\sin \theta = \frac{m}{n} \sin \varphi$ . Table II. Bowditch may be used for this purpose as follows; example: given  $m = 8$ ,  $n = 11$ , and  $\varphi = 39^\circ$ . Required  $\theta$ . Opening the table at  $39^\circ$ , opposite 8 (*distance*) we find in the *dep.* col.,  $m \sin \varphi = 5.0$ . We now call this  $n \sin \theta$  and search the table until  $n$  (11) in the col. of *dist.* is found opposite 5.0 in the col. of *dep.* This occurs on the page for  $27^\circ$ . Hence  $\theta = 27^\circ$ .

If  $\theta$  were given and  $n$  required, we would open the table the second time at  $\theta$  ( $27^\circ$ ) and take out  $n$  (11) opposite 5.0 in the *dep.* col.

In this case it is understood that the special problem is concluded when the vessels come within sight or signal distance of each other.

For long distances, where the curvature of the earth would affect the problem, there would be generally two sources of error: first, the theory assumes the surface sailed over to be a plane; and, secondly, the circle *Prs* would in general be projected on the chart as an oval. Under these circumstances a first trial course could be computed from the formula, from which a more accurate one could be obtained by a few experiments on the chart.

## II.—*When the vessels are in sight of each other.*

The course for the intercepting vessel may at first be obtained by any of the methods in case I., or may be roughly estimated by the eye; after which it is frequently verified and corrected by compass. The course is adjusted properly when the vessel to be intercepted is kept upon a constant bearing by compass.

Thus to determine the *course* of the intercepting vessel it is unnecessary to know its distance from the other; but if we should wish also to find the *time* required to effect the interception we must know or assume the distance *AB*. Then the distance *AP* or *BP* divided by the corresponding rate will give the time.

If we represent the distance between the vessels by *a*, then the time

$$t = \frac{a}{n \cos \theta - m \cos \varphi}.$$

## CHASING UNDER STEAM.

It is the intention here only to note one or two important points of the subject.

We assume the vessels to be on the open sea and the pursuing vessel to have the greater speed. Under these circumstances, and in the absence of accident, the *chaser* will accomplish the desired object in a less or greater period of time according as he shapes his course with more or less skill.

The longer the *time* occupied in coming up with the chase the greater is the probability of some circumstance happening which would favor her escape. Darkness, squalls, fogs, gales, etc., are among the possible incidents in her favor, while she divides equally with the chaser the chances of favorable results from accidents to machinery, spars or sails, or coming in the sight of strange vessels.

It is this consideration of *time and accident* alone which is the predominant feature of the problem. A mere increase of speed, or an increase of distance run, *unless it carry with it also an increase of time*, is of no advantage to the chase.

*As regards the chase.* By reference to the problem of intercepting, we see from the diagram (Fig. 1, Plate I.), or from the formula for  $t$ , that primarily (disregarding wind and sea) the *time* will always be greatest when the angles  $\theta$  and  $\varphi$  are zero, that is, when the chase steers directly from the chaser.

In the event of a wind and sea more or less ahead it may become a question whether or not the chase can prolong the time, by departing somewhat from the general rule and steering a course by which she has the wind less ahead.

A general solution of this question in its simplest form is not only difficult, from the exceeding complicated nature of the elements involved and our ignorance of the laws governing the effect of wind and sea upon the speed of ships; but even if we had such general solution, it is probable that one or more of the diverse qualities of the two ships as regards dimensions, form, surface exposed to wind, pitching motion, propelling apparatus, etc., would more properly render the case a special one.

The following considerations are presented.

Any change of course by the chase involves a *corresponding* change in the same direction on the part of the chaser, and any increase of speed thus acquired by the chase would be shared correspondingly by the chaser. Hence the *time* of the pursuit is not necessarily prolonged, for it depends, not upon speed, but upon *difference of speeds*.

Also it is not unreasonable to suppose that the very qualities which primarily give the chaser the superior speed may operate to his advantage when the course is changed.

Even if a change of course produce a change in speeds favorable to the chase, no advantage is acquired unless the gain from this source is greater than the positive loss primarily involved (disregarding wind and sea) by steering a course other than that directly from the chaser.

It would appear therefore that the general rule should be departed from with caution, and only under special circumstances; such, for example, as when the chase has great sail power, and the chaser little or none; or when the chase is of very light draft, and the chaser a deep vessel of great power.

The chase having determined her course, the chaser will intercept her by constantly correcting his course by compass. It is important to notice that it is the same *compass* bearing which must always be preserved, and not the bearing relative to the direction of the keel. The latter is subject to changes and errors due to imperfect steering; moreover, it changes to correspond with every change of course; while the compass bearing in a well-conducted chase remains the same throughout, regardless of the number and amount of alterations of course and speed.

#### WHEN THE CHASE ENDEAVORS TO REACH A POINT OF SAFETY.

Instead of trusting to the lucky issue which may attend a long pursuit, the chase may seek escape by steering for some point of safety, as a friendly harbor, or a position protected by forts or vessels. The chaser would as before keep the chase on the same bearing, so as to intercept her if possible.

Under these circumstances it may be very questionable whether the chase can reach the point of safety or not, and it is worthy of notice that while the chaser can readily determine this question definitely (supposing him to know the point steered for), the chase must obtain data by observations before and after a short run.

When the chaser has adjusted his course so as to keep the chase on a constant bearing, he has simply to notice on which side of the point of safety his course carries him; if on the side next the chase, the latter will be intercepted, but if on the other side, not.

The chase, however, has no such criterion. When practicable, the following method may be used to aid the eye in arriving at a correct conclusion.

Let  $A$  and  $B$  (Plate II., Fig. 2) be the respective positions of the chaser and the chase at any time after the chase has adjusted his course.

$P$  the point of safety toward which the chase steers, distant  $d$  miles from  $B$ .

$AP$  will then represent the limiting course which the chaser can steer to intercept the chase before reaching  $P$ .

Let  $B'$  be the position of the chase after running some distance  $k$  on her course.

By the rules of chasing,  $A$  will then be somewhere on the line  $A'''B'$  parallel to  $AB$ , and if he is steering the course  $AP$  he will be at  $A'$ .



Let  $m$  be the angle subtended by  $A$ 's mast from  $B$ ;  
and  $m_1$  " " " "  $B'$ .

If  $A$  is steering the course  $AP$  we can compute  $m_1$  from the formula  
 $m_1 = \frac{md}{d-k}$  in which we suppose  $m$  to be a small angle given in minutes.

If the observed angle at  $B'$  is greater or less than this computed value of  $m_1$  it indicates that  $A$  is steering some course  $AA''$  or  $AA'''$ .

A *greater* angle than the computed value of  $m_1$  shows that the chaser is at  $A''$ , and that interception will be made.

A *less* angle indicates the chaser at  $A'''$  and the chase may escape.

Any other angle may be observed, if convenient, instead of the angle subtended by the mast; for example, the horizontal angle subtended by the hull.

The method is equally applicable when the speed of  $B$  is greater than that of  $A$ . Moreover, it does not involve the speed of the chaser nor his distance from the chase.

#### SHORTEST DISTANCE BETWEEN SHIPS ON DIFFERENT COURSES. MAXIMUM AND MINIMUM DISTANCES.

If we know the positions of two ships at a given time, and their respective courses and speeds, we can determine the time when they will be at the shortest distance from each other.

In the diagram (Appendix A) let  $AB$  be the line of bearing, and  $a$  the distance between the two vessels at a given time.

Let  $n$  be the speed of  $A$ ,  
 $m$  " " "  $B$ ,

and  $\theta$  and  $\varphi$  the angles made by their respective courses with the line of bearing.

Then the time when they will be at the shortest distance from each other is given by the formula,

$$t = \frac{a(n \cos \theta - m \cos \varphi)}{n^2 + m^2 - 2nm \cos (\theta - \varphi)},$$

and this shortest distance by the formula,

$$d = \frac{a(n \sin \theta - m \sin \varphi)}{\sqrt{n^2 + m^2 - 2nm \cos (\theta - \varphi)}}. \quad \left\{ \begin{array}{l} \text{(For solution of this pro-} \\ \text{blem, see Appendix A.)} \end{array} \right.$$

These formulæ refer to the common incident of two vessels passing each other on different courses when no attempt is made by either to approach or avoid the other.

The data remaining as given above, let us suppose  $m$  the speed of  $B$  to be so much less than  $n$  the speed of  $A$ , that  $B$  is unable to intercept  $A$ . (See *Problem of Intercepting*.)

Then (Plate II., Fig. 1), although  $B$  cannot intercept  $A$ , it is evident that there is some particular course  $\varphi$  which he can steer, such that when the two vessels are at their shortest distance they will be *nearer* than if  $B$  had steered any other course.

Call this distance the *minimum* distance.

Also if  $B$  should try to avoid  $A$ , there is a course for  $B$ , such that when the vessels are at their shortest distance they will be *farther apart* than if  $B$  had steered any other course.

Call this the *maximum* distance.

Then for numerical computation the following formulæ hold :

$$\text{For the angle } \varphi, \sin \varphi = \frac{\pm \sqrt{n^2 - m^2} \cos \theta + m \sin \theta}{n}.$$

$$\text{For the time run, } t = \frac{a}{n \sqrt{n^2 - m^2}} \left\{ \sqrt{n^2 - m^2} \cos \theta \pm m \sin \theta \right\}$$

$$\text{For the distance apart, } d = \frac{a}{n} \left\{ \pm \sqrt{n^2 - m^2} \sin \theta - m \cos \theta \right\}$$

In all of which the upper sign pertains to the *minimum* distance, and the lower sign to the *maximum* distance.

These results are more readily reached by geometrical construction, thus :

Let  $A$  and  $B$  represent the positions of the respective ships when they are at the given distance  $a$  from each other.

Construct a right-triangle, base  $a$ , whose hypotenuse and perpendicular are in the ratio  $n$  to  $m$ . (The same as described in the *Problem of Intercepting*.) This determines a point  $R$ . On  $AR$  and  $BR$  respectively as diameters describe circles.

Then at  $A$  lay off the angle  $\theta$  with the line of bearing, giving the course  $AD$ , and mark the point  $C$  where this course cuts the larger circle.

To find  $\varphi$ , or the course of  $B$ , we have simply to join  $BC$ .

The point  $H$ , where this course cuts the smaller circle, indicates the position of  $B$  at the *minimum* distance, and  $CH$  is this distance.

To find the course for maximum distance we construct the circles on the other side of the line of bearing; then similarly  $BH'$  is the course, and  $C'H'$  is the *maximum* distance.

By putting himself at the *minimum* distance, a vessel  $B$  would be the better able to attract the attention of  $A$  by night signals, guns,

Plate II.

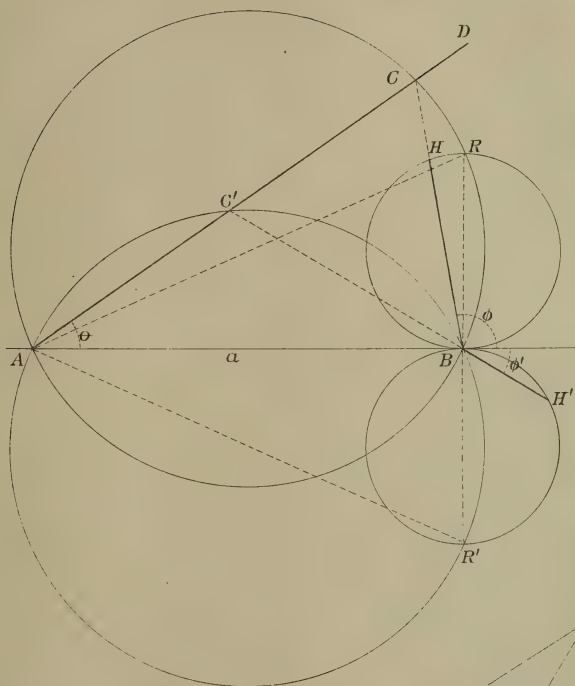


Fig. 1.

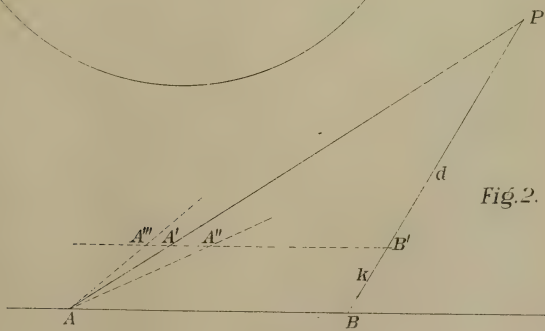


Fig. 2.









etc.; or if it were desirable to avoid  $A$ , his best chance would be to put himself at the maximum distance. (For solution of the above, see Appendix B.)

#### TO APPROACH A VESSEL OF SUPERIOR SPEED WHEN HER RETREAT IS LIMITED TO CERTAIN COURSES.

Owing to the conformation of a shore line, the position of shoals or other dangers, a vessel unprepared to resist may be so situated that she becomes subject to attack by another vessel of equal or less speed.

Thus the attacking vessel may have one opportunity and no more of striking a blow, and the fire from great guns and small arms would be of limited duration unless the speed of the retreating vessel were reduced by a lucky shot.

It becomes therefore a matter of the first importance that the approach of the attacking vessel should be so made that her scant opportunities may not be lost by a false manœuvre.

In the diagram (Plate III.) let  $P$  be the position of the chase, and  $A$  and  $B$  the points which limit his lines of escape. As an example, suppose the speed of the chaser to be  $\frac{9}{10}$  the speed of the chase.

Then while the chase could run the distance  $PA$ , the chaser could run a distance equal to  $\frac{9}{10}$  of  $PA$ , or  $Aa$ . With  $A$  as a center describe an arc with radius  $Aa$ . Similarly with  $B$  as a center describe an arc with radius  $Bb$  ( $=\frac{9}{10} BP$ ).

If these two arcs intersect, a figure  $rstu$  (which we will call a lune) will be formed. The line  $rt$  will be perpendicular to  $AB$ , and the point  $O$  where  $rt$  meets  $AB$  may be called the center of figure.

It is evident that if the chaser gain any position within the lune he can intercept the chase whatever route the latter may take, but if the chaser is outside the lune the chase may escape.

The chaser therefore endeavors to determine and reach the point  $O$ , since any error reckoned from this point is less likely to place him outside the lune.

To determine  $O$  we observe first that it always lies on  $AB$ , and secondly, on some line  $rt$  perpendicular to  $AB$ . It can further be shown that when the speeds are equal,  $rt$  will be the perpendicular from  $P$ , cutting  $AB$  in  $L$ , and when the speeds are so different that the circles touch without intersecting,  $rt$  will pass through  $K$  (where the bisector from  $P$  cuts  $AB$ ).

Thus in all practical cases  $O$  is found between  $L$  and  $K$ . Therefore the chaser should stand in on a perpendicular to  $AB$  heading between

$L$  and  $K$ ; that is, a little to that side of  $P$  on which the longer side of the triangle lies. His course should carry him nearer  $L$  as their rates are more nearly equal, and nearer  $K$  as their relative rates are more nearly such that the chaser cannot control both lines of escape.

It is true that if the chaser should stand in on the bisector of the angle  $APB$  he would in all practical cases find himself within the lune when he arrived on the line  $AB$ ; but the advantage of standing in on the perpendicular  $tr$  is that a point within the lune may be reached *sooner* than when standing in on the bisector.

### CHASING UNDER SAIL.

The numerous contradictions and barren discussions which are found in the literature of chasing under sail can only be explained by assuming that the fundamental principles involved were either unknown or disregarded by many of the writers.

The principal point in controversy at present is whether or not the chaser must tack when he has brought the chase abeam; that he should do so, and that he prolongs the chase if he stands on, is the opinion of many, while others speak of such a rule as a popular delusion.

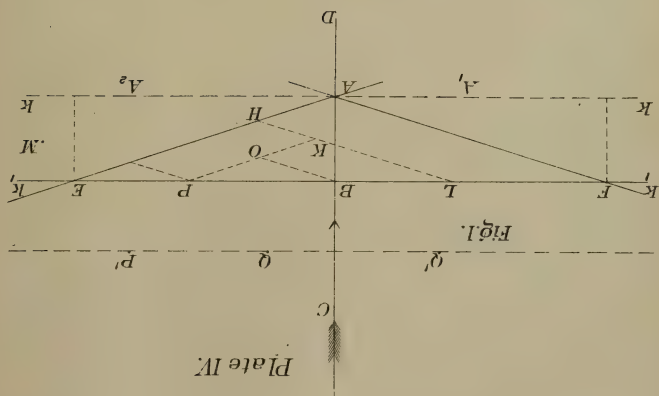
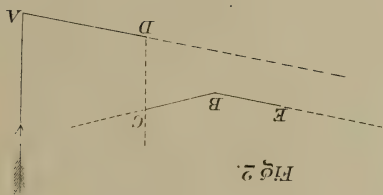
Fortunately it is unnecessary to compare the peculiar merits of each system, for they are nearly all reconcilable in the common attempt to perform an impossibility, and hence are equally good and equally bad.

The error is an attempt to directly *prolong* or *shorten the time* of the chase by manœuvres which have no direct influence whatever upon the *time*.

In the diagram (Plate IV., Fig. 1) let  $CD$  represent the direction of the wind, and let lines perpendicular to this direction,  $kk, k_1k_1$ , be called "*windward parallels*," or briefly "*parallels*."

Let  $AE$  and  $AF$  represent the two courses which a vessel at  $A$  can steer when by the wind. Call these lines or their extensions *weather lines*, and when reference is made to any point *between the weather lines*, the point is supposed to lie somewhere in the angle which is directly to windward of  $A$ .

If a vessel start from  $A$  and continue on one tack she will cross the parallel  $k_1k_1$  at  $E$ . If, however, she tack once or oftener as at  $H, K, O$ , etc., she will cross the same parallel at some other point as  $L, P$ , or  $B$ . Whichever tack the vessel may be on, if she steer by





the wind her course is always parallel to one or other of the two lines  $AE$  or  $AF$ , and these two courses are of the same value in gaining to windward.

Thus, whatever route she may take, that is, let her tack when or where she may, her track from  $A$  to the parallel  $k_1k_1$  may be regarded as a system of parallel lines between parallel lines. A simple geometrical proposition then establishes the fact that the total length of her track sailing by the wind from  $A$  to the parallel  $k_1k_1$  will always be the same regardless of the route she may pursue or the point where she crosses the *parallel*. Moreover, the distance travelled will always be equal to  $AE$ . Therefore it is evident that *in a given time*, a vessel starting from some point  $A$  can place herself at any desired point whatever between  $E$  and  $F$  on a parallel  $k_1k_1$ .

The above principle is stated here because it is elementary to the subject of chasing to windward; but it has direct practical applications.

Thus (disregarding the question of time lost or gained by the *evolution* of tacking), it shows that a vessel at  $A$  beating up for a port on a weather shore  $k_1k_1$ , can gain the point  $B$  *dead to windward*, or any other point between  $E$  and  $F$  as quickly as she can reach the point  $E$  on the first board.

Also a number of vessels situated as  $A, A_1, A_2$  on a parallel  $kk$  can converge simultaneously at any selected point between  $E$  and  $F$  on the parallel  $k_1k_1$ .

A fleet of vessels sailing by the wind when the line of bearing is a parallel  $kk$  may converge or deploy without loss of time while turning to windward. This line of bearing will be preserved although the vessels tack at will, while any other line of bearing can only be preserved by simultaneous evolutions.

Since the *time* required to sail from a point  $A$  to any point  $P$  *between the weather lines*, and the *distance* sailed over, do not depend at all upon the actual distance from  $A$  to  $P$ , but upon the distance  $AB$  between the parallels (through  $A$  and  $P$ ), we may call this the "tactical distance," and it is equivalent in point of *time* and actual distance to  $AE$ .

A vessel at any point  $P$  (or  $M$ ) is said to be to windward of another vessel  $A$  when the parallel through  $P$  or  $M$  is nearer the point from which the wind appears to issue than the parallel through  $A$ .

Much importance is attached to this definition by some writers, as they determine by its application whether the chase should or should not haul by the wind; and accordingly they are particular to caution

observers to take the bearings with care and not mistake the *apparent* direction of the wind for its *true* direction.

It is a mistake, however, to make the conduct of the chase depend upon the fact of her being either to windward or to leeward of the chaser as determined by this definition.

In chasing under sail the same principles apply as in chasing under steam. The primary object being to gain *time*, the chase should, whenever possible, *steer directly from* the chaser. Whenever the vessels are so situated that the chase cannot steer directly from the chaser, he should steer as nearly as possible in that direction; that is, he should steer by the wind.

The diagram shows that the chase can always steer directly from the chaser unless she is *between the weather lines* of the chaser.

When the chase can steer directly from the chaser, the conduct of both vessels is governed by the principles of a chase under steam.

Refined selections of course based upon the *best sailing point* of a particular vessel should be made with caution. Whatever advantage in speed the chase may gain by changing her course, will be shared, in part at least, by the chaser.

Exception may be made when it is known that the chase can sail nearer the wind than the chaser, or when the chase has peculiarly good sailing qualities by the wind and the chaser has not. Under these circumstances the chase may be warranted in hauling by the wind, provided it does not involve too much deviation from the course required by the general rule.

### *Chasing to Windward.*

When the chase is discovered between the weather lines of the chaser or upon one of them to windward, she should haul by the wind. The chaser does likewise, and the ensuing operations are called chasing to windward.

In discussing principles, no account is taken of time lost or gained in the operation of tacking.

The primary question for the chase to determine is, what can be done on her part, if anything, to prolong the chase in point of time.

Since the chase is to keep by the wind she is restricted to the two close-hauled courses; but these being equivalent in gaining tactical distance she is virtually restricted to one course, and thus we can assert from the principles of intercepting that there can be but one *time* before she will be reached by the chaser.



The same conclusion is reached from the following simple consideration. Suppose that by adopting any possible route the chase is finally overhauled at a point  $P'$ . Now if *any other route* whatever had been adopted, the only change it could produce is that the chase might, at the end of the same time, be on some other point  $Q$  of the *parallel through  $P'$* . But the chaser also can gain the point  $Q$  as readily as  $P'$ . Thus the actual interception will occur at the end of a certain time and on a certain parallel, and the chase can do nothing to prolong this time.

Since the chase is unable to prolong the time, it remains to be seen if there are any circumstances which she can control to her advantage.

It is readily seen that at any time during the chase, the "tactical" distance of the two vessels will be the same, no difference what routes they may adopt. But this is not the case with their "actual" distance apart. By passing each other on opposite tacks or on the same tack, or by standing a longer or shorter time on either tack, we see that the actual distance apart of the two vessels may be made to vary considerably within certain limits.

It is desirable for the chase to keep as far as possible from the chaser for two reasons. First, to keep out of range; and secondly, that in case of a favorable shift of wind their "tactical" distance may be as great as possible. To these may be added her increased chances of escape by the approach of night, thick weather, etc.

Thus skill on the part of the chase consists in keeping the *actual* distance apart as great as possible, and skill on the part of the chaser in keeping it as short as possible, while no advantage of time can be gained by either, save by accident or deliberate neglect on the part of the other.

The shortest distance which the vessels can be apart at any time is the perpendicular distance between their parallels. To attain this the chaser seeks to put himself directly to leeward of the chase; and this consideration determines the tack that the chase should adopt at the outset.

If the chase at  $B$ , Plate IV., Fig. 2, discover the chaser at  $A$ , the chase will take the starboard tack, thus keeping the actual distance as great as possible. Should the chase take the port tack at  $B$ , he will pass directly to windward of the chaser at some point  $C$ . At this point the actual distance between the vessels is as short as possible, and the control of this distance is now entirely within the

management of the chaser, whatever the chase may do. The chase by passing to windward of the chaser abandons the slight and only advantage he had at the outset. If he ever recover it, it is only by permission of the chaser. Thus "prima facie" the chase should continue on one tack.

When the chaser has come directly to leeward of the chase, whether from a long stretch on the first board, or from the conduct of the chase in passing to windward of him, he has gained all the advantage possible, and his object henceforth is to retain it.

THEORETICALLY the chaser should keep directly to leeward of the chase. This is practically impossible, as it requires incessant and instantaneous evolutions. The chaser therefore simply reduces the question to a practical one by sacrificing a part of his advantage of *short actual distance* for the purpose of making longer and more useful boards. It is a matter of compromise which must be determined by the state of the wind and sea and the manœuvring qualities of his vessel. By making long tacks he loses "actual" distance, by making short ones he may lose time and run risks in stays.

Thus when the chaser is directly to leeward of the chase, the latter can do nothing to acquire an advantage; whether she tack or not the duty of the chaser is plain. He has only to keep the chase as NEARLY AS PRACTICABLE in line with the wind.

By keeping directly to leeward of the chase, any shift of wind whatever will be an advantage to the chaser. This is easily seen by drawing parallels through *A* and *B* with reference to the new direction of the wind.

If the chaser for any reason should be indifferent about maintaining himself at the shortest practicable distance from the chase, he is subject only to the following restriction:

The chaser should *never cross either weather line* of the chase; *i. e.* when on opposite tacks he should never cross her wake, and when on the same tack he should never pass that point where, by tacking, he would head directly for her.

If these limits should be passed by the chaser, the conditions are no longer those of chasing to windward, and the chase might profit by steering directly from the chaser.

Within the above limits all rules laid down directing when or where the chase should tack for the purpose of prolonging the pursuit, or when or where the chaser should tack in order to shorten it, are absurd. Their apparent random movements tend to a result as definite in time as if they were chasing in line ahead.

Whatever difference of opinion may formerly have existed regarding time lost or gained by the evolution of tacking, it is generally admitted that the present type of ocean sailing ships can gain nothing.

*The Rules then for the Chase are :*

1st. Bring by the wind on that tack which carries her the more directly from the chaser.

2d. If when the chaser has gained the shortest actual distance from the chase, he shows a determination to retain it, the chase can gain nothing by tacking, and should hold on her course to the end.

3d. If the chaser is indifferent about keeping at the shortest distance from the chase, the latter then may tack at discretion, to gain what advantage there is in the longer distance.

*Rules for the Chaser.*

1st. Bring by the wind on the tack which carries him the more directly toward the chase.

2d. When the chaser has arrived directly to leeward of the chase, he should maintain himself at this shortest distance as nearly as practicable. (Here the chaser must exercise judgment. The oftener he tacks the more nearly he keeps the chase in line with the wind ; but if he tacks too frequently he may sacrifice progress.)

3d. However indifferent the chaser may be as to his "actual" distance from the chase, he must never cross either weather line of the chase.

The foregoing principles are subject of course to the modification required by special circumstances. If it be found that one of the vessels is quick and reliable in stays, while the other is not, or if one can lie nearer the wind than the other, it may be advantageous to depart from the general rule.

Since the operation of tacking generally involves loss of time, and since the advantage of close distance may at times be dispensed with, it would seem that the chaser is more liable to err by tacking too often than by tacking too seldom.

If by going from one tack to the other in rapid succession the chase could *compel* similar manœuvres on the part of the chaser, the common delay experienced by both vessels might operate to prolong the chase. But this is not the case ; the discretion of the chaser in standing on is limited only by Rule 3.

## SUGGESTIONS RELATIVE TO CHASING.

The following suggestions are mentioned by nearly all authorities :  
Exhibit no lofty canvas, at daybreak, until the horizon has been carefully scanned.

On discovering a strange sail keep your masts in line with her, and take in upper sails until you have been noticed or have determined your plans.

The chaser should not abandon the pursuit merely because he discovers that his speed is not superior. An accident to sails or spars may throw the chase in his hands.

If the weather and sea change, the chase may carry too much or too little canvas and thus lose by unskillful sailing.

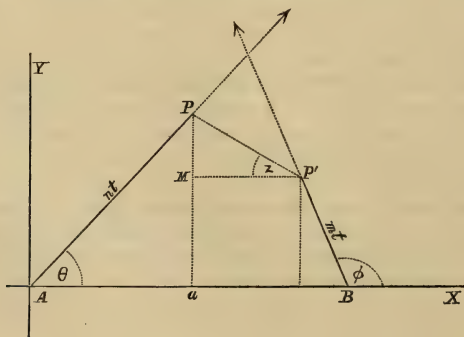
Change in the force of wind or sea may, in itself, give the advantage of speed to the chaser.

When chasing in line ahead it has been said that the chaser, though only of equal speed, will gain upon the chase, because he has a distant object to steer by, while the chase steers by compass.

## APPENDIX A.

*Problem.*—Given the *bearing* and *distance* of two vessels *A* and *B*, and their respective *courses* and *speeds*; it is required to know how close they will pass to each other, the time elapsed when the shortest distance is attained, and the bearing of the vessels from each other at this time.

*Solution.*—In the diagram let *A* and *B* represent the given positions of the two vessels on the line of bearing distant from each other *a* miles.



Let  $\theta$  and  $n$  denote the course and speed of  $A$ .  $\varphi$  and  $m$  the course and speed of  $B$ . We are to find

$D$ , their shortest distance from each other,

$T$ , the time elapsed when this distance is attained,

and  $Z$ , the angle by which their bearing may be expressed.

Take the line of bearing for axis of  $X$  and the perpendicular through  $A$  for  $Y$ .

Let  $P$  and  $P'$  be the positions of the respective vessels after *any* assumed interval of time,  $t$ .

$nt$  will represent the distance passed over by  $A$ ,  
and  $mt$  will represent the distance passed over by  $B$ .

The co-ordinates of  $P$  are  $(nt \cos \theta, \quad nt \sin \theta)$ .

The co-ordinates of  $P'$  are  $(a + mt \cos \varphi, \quad mt \sin \varphi)$ .

Denote the distance  $PP'$  by  $d$ .

The right-triangle  $PMP'$  will then give the equation

$$[nt \sin \theta - mt \sin \varphi]^2 + [a + mt \cos \varphi - nt \cos \theta]^2 = d^2.$$

Expanding and arranging as an equation in  $t$ , we have

$$\left. \begin{aligned} \{n^2 + m^2 - 2nm \cos (\theta - \varphi)\} t^2 \\ + 2a(m \cos \varphi - n \cos \theta)t + a^2 - d^2 = 0. \end{aligned} \right\} \quad (1)$$

This is a quadratic giving in general two values of  $t$  for a given value of  $d$ . If, however,  $d$  is given its *limiting* value, the two values of  $t$  will be equal; *i. e.* the equation (1) will have equal roots.

The condition for equal roots in (1) is

$$a^2[m \cos \varphi - n \cos \theta]^2 = (a^2 - d^2)[n^2 + m^2 - 2nm \cos (\theta - \varphi)]. \quad (2)$$

From which we obtain the limiting value of  $d$ ,

$$\begin{aligned} D^2 &= \frac{a^2[n \sin \theta - m \sin \varphi]^2}{n^2 + m^2 - 2nm \cos (\theta - \varphi)} \\ \text{or} \quad D &= \frac{a[n \sin \theta - m \sin \varphi]}{\sqrt{n^2 + m^2 - 2nm \cos (\theta - \varphi)}}. \end{aligned} \quad (3)$$

The corresponding value of  $t$  is found directly from equation (1). (Since the roots are equal the value can be written by observing the coefficients of  $t^2$  and  $t$ .)

$$T = \frac{a(n \cos \theta - m \cos \varphi)}{n^2 + m^2 - 2nm \cos (\theta - \varphi)}. \quad (4)$$

The condition that will make the shortest distance, zero, is found from (3)

$$n \sin \theta = m \sin \varphi, \quad (5)$$

which is the same as previously found in the problem of intercepting.

When this condition holds, the time given by (4) reduces to

$$T = \frac{a}{n \cos \theta - m \cos \varphi}. \quad (6)$$

The bearing of the two ships is found from

$$\tan z = \frac{PM}{P'M} = \frac{nt \sin \theta - mt \sin \varphi}{a + mt \cos \varphi - nt \cos \theta}. \quad (7)$$

Substituting the value of  $t$  given by (4) and reducing, this becomes

$$\tan Z = \frac{n \cos \theta - m \cos \varphi}{n \sin \theta - m \sin \varphi}. \quad (8)$$

### APPENDIX B.

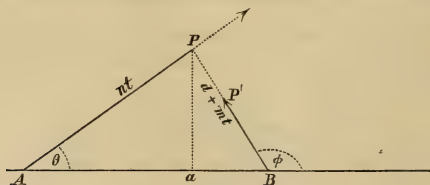
When the conditions expressed by the equation  $m \sin \varphi = n \sin \theta$  give an impossible value for  $\sin \varphi$  the vessel  $B$  cannot intercept  $A$ . We are then led to consider the following

*Problem.*—Given the *bearing* and *distance* of two vessels  $A$  and  $B$ , the *course* and *rate* of  $A$ , and the *rate* of  $B$ ; it is required to determine  $D$ , the nearest possible distance which  $B$  can approach to  $A$ , also  $\phi$ , the necessary course for  $B$  to steer, and  $T$ , the time required to gain the shortest distance.

*Solution.*—As heretofore  $\theta$  and  $n$  will designate *course* and *rate* of  $A$ ,  $\varphi$  and  $m$  will designate *course* and *rate* of  $B$ , and  $a$  will denote the original distance of the vessels from each other.

Suppose at the end of *any* assumed time  $t$ , the vessel  $A$  has reached  $P$ . Then in order that  $B$  should be as near as possible to  $A$  at the end of this time  $t$ ,  $B$  must have steered toward  $P$ , the course represented by  $\varphi$ , and would be at some point  $P'$  on  $BP$ .

Also  $nt$  will express the distance  $AP$ ,  
 $mt$  will express the distance  $BP'$ ,  
 and the distance  $PP'$  between the vessels will be denoted by  $d$ .



The triangle  $ABP$  gives the following equation,

$$(d + mt)^2 = n^2 t^2 + a^2 - 2ant \cos \theta. \quad (1)$$



Arranging for  $t$

$$(n^2 - m^2)t^2 - 2(an \cos \theta + md)t + a^2 - d^2 = 0. \quad (2)$$

For a given value of  $d$  this equation has two roots. Should the roots be equal it would indicate that  $d$  has its *limiting* value (*i. e.* greatest or least).

The condition for equal roots in (2) is

$$(an \cos \theta + md)^2 = (n^2 - m^2)(a^2 - d^2) \quad (3)$$

which can be arranged thus:

$$d^2 + \left( \frac{2am \cos \theta}{n} \right) d = \frac{a^2(n^2 \sin^2 \theta - m^2)}{n^2}. \quad (4)$$

Solving (4) we derive the required limiting value of  $d$ .

$$D = \frac{a}{n} \{ \pm \sqrt{n^2 - m^2} \sin \theta - m \cos \theta \}. \quad (5)$$

Knowing that  $t$  has equal roots for this value of  $d$ , we easily obtain  $t$  from equation (2).

$$T = \frac{an \cos \theta + \frac{ma}{n} (\pm \sqrt{n^2 - m^2} \sin \theta - m \cos \theta)}{n^2 - m^2}.$$

Which reduces to

$$T = \frac{a}{n \sqrt{n^2 - m^2}} \{ \sqrt{n^2 - m^2} \cos \theta \pm m \sin \theta \}. \quad (6)$$

$\varphi$ , may be found from the figure:

$$\sin \varphi = \frac{nt \sin \theta}{d + mt}.$$

Substituting the above values of  $D$  and  $T$  and reducing, we obtain

$$\sin \varphi = \frac{\pm \sqrt{n^2 - m^2} \cos \theta + m \sin \theta}{n}. \quad (7)$$

The double values found for  $D$ ,  $T$  and  $\varphi$  signify that with the given conditions *two* positions may be reached by  $B$  at both of which the distance from  $A$  will be a limiting one.

If the problem had been to find the *GREATEST possible distance* which  $B$  can attain from  $A$  as the vessels pass each other, similar equations to the above in the solution would have led to identical results.

Investigation of the above results shows that the upper signs in (5), (6) and (7) refer to the *shortest* distance, and the lower signs to the *longest* distance.

A simple geometrical solution can be obtained, enabling us to draw an accurate figure and study the peculiarities of the problem (see Fig. 1, Plate II.).

We can show that the angle between the courses is a constant angle (whosesine is  $\frac{\sqrt{n^2 - m^2}}{n}$ ) for all values of  $\theta$ .

This angle is  $(\varphi - \theta)$  and its sine is

$$\sin \varphi \cos \theta - \cos \varphi \sin \theta. \quad (8)$$

From (7) we obtain

$$\cos \varphi = \frac{-\sqrt{n^2 - m^2} \sin \theta \pm m \cos \theta}{n}.$$

Substituting the values of  $\sin \varphi$  and  $\cos \varphi$  in (8) we deduce  $\sin (\varphi - \theta) = \frac{\sqrt{n^2 - m^2}}{n}$ . That is,  $ACB$ , the angle between the courses (Plate II., Fig. 1) is *constant* and is the complement of the angle whose sine is  $\frac{m}{n}$ .

Since this angle is constant its vertex must move in the circumference of a circle, and  $\theta$  must increase and  $\varphi$  decrease (or the reverse) by exactly the same rates.

As  $\theta$  increases we may regard the distance  $nt$  as a vector and  $\theta$  a vectorial angle.

Similarly then we can regard  $mt$  as a vector and  $\varphi$  its corresponding vectorial angle.

The vectorial angles change at the same rates, and the ratio of the vectors  $nt$  and  $mt$  is constant; therefore the curves traced by the extremities of the vectors will be similar. The curve traced by  $(\theta, nt)$  is a circle, and consequently  $(\varphi, mt)$  describes a circle also.

When the vector  $nt$  coincides with the diameter  $AR$ , the vector  $mt$  coincides with the perpendicular  $BR$ , which must therefore be a diameter of the smaller circle.

We therefore describe the circles as shown in the diagram (Plate II., Fig. 1), and the problem is solved by the construction described under the head of Maximum and Minimum Distances.

NAVAL INSTITUTE, ANNAPOLIS, MD.

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## CURVES OF PRESSURE IN GUNS.

BY LIEUTENANT J. F. MEIGS, U. S. N.

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In this paper are presented, (1) certain new ways of regarding the quantities  $\frac{\text{muzzle energy}}{\text{pressure}}$ ,  $\frac{\text{muzzle energy}}{\text{weight of powder}}$ , and  $\frac{\text{muzzle energy}}{\text{weight of gun}}$ , together with a new measure of the progressiveness of powder; and (2) the apparently best method of obtaining muzzle and chase pressures in guns.

### I.

For all guns made and tested at the present time, the maximum pressure upon the breech plug and the muzzle velocity are ascertained by direct measurement with pressure gauges and chronographs. The first of these quantities, it is not infrequently asserted, is not correctly given by the methods generally followed; and the second is universally admitted to be slightly greater than the velocity of the projectile at the instant that it cleared the muzzle; for the reason that the shot is, for a time after clearing the muzzle, enveloped in powder gas whose velocity is greater than its own. The correctness of the maximum pressure given when powder is the explosive used and with ordinary methods, has, however, been experimentally shown by Sarrau and Vieille, in the *Étude sur L'Emploi des Manomètres à Écrasement*; the authors having ascertained by experiment that, when a copper cylinder is subjected to a given maximum pressure, whether rapidly applied by a Rodman or other similar machine, or reached with the quickness ordinary in guns, the shortening will be the same. We have then, always, the correct maximum pressure to which the breech of the gun has been subjected, and a velocity which is greater than the true muzzle velocity. From these data, and others which are available, the values of the three quantities already referred to are derived.

It will conduce to clearness to examine these three quantities, and ascertain their dimensional values if possible. In  $\frac{\text{muzzle energy}}{\text{pressure}}$ , the pressure taken is always that on unit area. If, however, we take the total pressure upon the projectile's base,  $\frac{\text{muzzle energy}}{\text{pressure}}$  is a length: that which the gun must have in order that, by acting continuously along it, the maximum pressure may produce the known muzzle energy. This length is always in practice less than the length of travel of the projectile in the gun; and the ratio of this *effective* length, as it may be called, to the travel of the shot is the only available true measure of the progressiveness of the powder when only the data referred to are had; perfect progressiveness being reached by the maintenance of a uniform pressure along the gun's length. In this case the ratio above suggested— $\frac{\text{effective length}}{\text{length of travel}}$ —is evidently numerically equal to unity.

If then we reckon total pressures on the shot's base, and call  $W_1$ ,  $W_2$ ,  $W_3$  the weights of the gun, projectile, and charge respectively, and  $V$  the projectile's muzzle velocity, we have

$$\begin{aligned}\frac{\text{muzzle energy}}{\text{gun's weight}} &= \frac{\frac{W_2 V^2}{2g}}{W_1} = \frac{W_2}{W_1} \cdot h, \\ \frac{\text{muzzle energy}}{\text{powder's weight}} &= \frac{\frac{W_2 V^2}{2g}}{W_3} = \frac{W_2}{W_3} \cdot h, \\ \frac{\text{muzzle energy}}{\text{total pressure}} &= \text{effective length};\end{aligned}$$

where  $h$  is the height which will produce the velocity  $V$  in a body falling unresisted. It thus appears that the first two of these quantities are connected if the weights remain fixed. In our VIII.-inch B. L. R. of 27,600 lbs., we have, if  $W_2 = 250$  lbs. and  $W_3 = 125$  lbs., energy per pound of powder = energy per pound of gun  $\times 220$ , about. The third quantity, what has been called the effective length, is, however, the most useful datum; and, when divided by the actual travel of the shot in the bore, it is equal to the ratio  $\frac{\text{mean of all the pressures}}{\text{maximum pressure}}$ , and is strictly comparable between guns of differing calibers. This assumes no more than that the form of all pressure curves is the same; and if it be not granted that this is the

case, then it must be admitted that it is possible to make them so by alterations in the conditions of loading, and that they should all have the form of the one which is best. With a view to showing that effective length travel of shot is nearly or quite constant under service conditions of loading, the following table is here inserted :

Class of Gun.	Weight and kind of powder.	Weight projectile; pounds.	Muzzle velocity; feet-seconds.	Pressure; lbs. per square inch.	Muzzle energy; Total Pressure feet.	Travel of shot; feet.	Effective length. Length of travel.
VIII.-inch B. L. R...	125 lbs.; cocoa.	250	2041	32000	10.12	16.41	.61
" " ...	125 lbs.; black.	250	1948	43000	6.858	16.41	.42
VI.-inch B. L. R.....	29¼ lbs.; cocoa.	51	1685	12100	6.613	10.00	.66
" " ...	32 lbs.; black.	75.4	2001	30975	5.353	13.08	.41
" " ...	50 lbs.; cocoa.	100	1836	25700	7.248	11.62	.62
" " ...	49 lbs.; black.	100	1880	36700	5.289	11.62	.46
VIII.-inch M. L. R....	35 lbs.; black.	180	1377	26600	3.964	8.63	.46
60-pounder B. L. R..	10 lbs.; black.	46.5	1427	18300	3.669	7.67	.48
3-inch B. L. R.....	12 oz.; black.	7	980	10720	1.385	3.22	.43

The data given in this table are all from experimental sources, except that for the VIII.-inch B. L. R.; this was derived by computation by Sarrau's methods. All the black powder mentioned was spherical powder of 123 granules to the pound, and specific gravity about 1.78, except that for the VIII.-inch B. L. R., which was spherical of 50 granules to the pound, and that for the 3-inch B. L. R., which was navy cannon powder. The cocoa powder was all the same; C<sub>82</sub> prismatic grains of specific gravity 1.867 and running 10.06 granules to the pound. It will be observed that the ratio effective length length of travel is very nearly constant for the black powder; it being

highest in the 60-pounder and lowest in the longest VI.-inch gun, as might perhaps have been anticipated with the powder used. The well-known progressive nature of the cocoa powder is clearly shown.

The foregoing leads naturally to an examination of the general form of pressure curves in guns. There are some artillerists who advocate the use of high pressures and economy in the consumption of powder; while others, including all those who have actually the responsibility of construction, favor lower and more uniform pressures. When the relatively uncertain and violent nature of

gunpowder is considered, and when it is considered that the factor of safety of guns near the breech and chase rarely or never reaches  $1\frac{1}{2}$ , it is extraordinary that any adherents of the former practice should be found. If the pressure shoots up suddenly to a high maximum, and then falls towards the muzzle from the increase of the volume in which the gas is contained, the muzzle pressure will be low, if the gun is long enough, and the gas will be of low tension when blown out; and consequently only a small amount of work will be lost. But if the pressure be maintained towards the muzzle by the increase of weight of gas from portions of powder still burning, the muzzle pressure may be high and the amount of work lost great.

As long as the weights of gun, projectile, and powder do not change, the quantities muzzle-energy per pound of gun and per pound of powder will increase or decrease together; when, by any alteration in other circumstances of loading, the form of the pressure curve is altered. The latter change requires, of course, that the external form of the gun should be changed. If we suppose that the form of the pressure curve may be altered as we please, and also permit of variation in the weights of gun, projectile, and charge, it becomes evident that increase in energy per pound of gun is directly opposed to increase in energy per pound of powder. For, if we wish to increase energy per pound of gun, we must dispose the available weight of gun in the best manner possible. To do this, since the hoop-tension which is transmitted to any point in the mass of a thick hollow cylinder, when subjected to inside stress, diminishes as the square of the radius as we go outwards, the weight must be put at as short a radius as possible, or the gun must be a cylinder. If then the safe pressure acts uniformly throughout the gun's length, the greatest attainable value of energy per pound of gun will be reached. Also it is clear that, since in any actual case where the above conditions are realized, a part of the powder will be blown out unburned, and the final tension of the gas be high, energy per pound of powder must be relatively small. The greatest value which energy per pound of gun can theoretically reach will be attained when the gun's chase is a very long and very thin cylinder, and is numerically about 9000 foot-pounds per pound of gun, with a gun built of steel whose elastic strength is 45,000 pounds per square inch. One-eleventh of this limiting value would be a large figure to reach in practice. It is to be observed, however, that it is more precise to use the weight of the gun without the chamber in statements of energy per pound of gun,

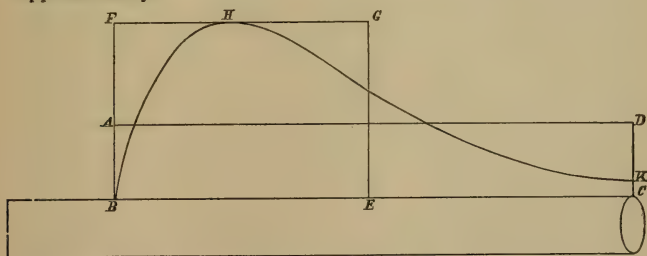


as this part of the gun alone directly produces muzzle-energy. The figures just given have been so arrived at.

To increase energy per pound of powder, on the other hand, we must use the powder gas expansively, so to speak. The pressure must be allowed to reach a high maximum, and the gun must be long enough to allow the gas to expand to a low pressure. In this case the gun must be very thick at the breech, and may thin away towards the muzzle; the lengthwise section of its exterior being concave outwards. Evidently the conditions which the gun and charge must fulfil in this case are totally different from those of the former case.

It thus appears that, looking at the question broadly, the endeavor to attain high values of both these quantities leads to compromises and a mediocre result in each.

Unless the difficulty of stowing and carrying large charges becomes of commanding importance, it is sound practice to endeavor to increase energy per pound of gun by variation of the form of the pressure curve and outside form of the gun, with a secondary regard only to energy per pound of powder. As energy per pound of gun is increased by causing the pressure curve to approach a straight line parallel to the axis of the gun, the effective length will approach in value to the length of travel in the gun, or the ratio  $\frac{\text{mean pressure}}{\text{maximum pressure}}$  approach unity.



If the diagram represent the bore of the gun, and  $BHK$  the ordinary form of the pressure curve, and we draw two rectangles  $FBEG$  and  $ABCD$ , each of area equal to that under the pressure curve; the former having its height equal to the maximum pressure  $BF$ , and the latter its base equal to the travel of the shot in the gun  $BC$ ; then  $BE$  is the effective length,  $BA$  the mean of the total pressures, and

$$\frac{BE}{BC} = \frac{BA}{BF}.$$

The endeavor to make the mean pressure approach the maximum pressure has led to the use of enlarged chambers in guns, and it is interesting to note that the effect of this feature of practice upon the weight of the gun is small. For it is easy to show from the formulæ ordinarily used for computing the strength of guns, that if we neglect the weight of the breech plug, or consider the chamber open at both ends, its weight for a constant internal volume (or constant weight of charge) and constant strength is independent of the internal radius. In other words, as between two chambers whose internal volume and safe maximum pressure are the same, the only difference in their weights will be that of their breech plugs. This is evidently the only fair way of making the comparison in question.

## II.

There is at present no universally accepted method of determining muzzle and chase pressures in guns, and it is intended here to present shortly the methods of determining them by Sarrau's equations and to advocate the adoption of these. Mr. Anderson, C. E., of England, in his Howard Lectures on the Conversion of Heat into Useful Work, has recently presented a method in which he *assumes* the temperature of the powder gas at the instant the projectile clears the muzzle; and from the further assumption that the temperature and pressure of the gas are connected by the well-known laws which apply to more simple gases, deduces the muzzle pressure. It is obvious that we might as well assume the pressure at once, and the method cannot be admitted to be of practical use. Mr. Anderson's advocacy of Sébert's methods is well judged; but the application of these to practice has hardly begun, Sébert himself giving very few; while his reasoning does not contain fewer unsatisfactory approximations than Sarrau's.

It may be said that little or nothing is known of the muzzle and chase pressures in most guns; and yet this knowledge is most essential, with regard to both the safety of the gun and the intelligent study of the behavior of the powder. It will be admitted that if we have the law connecting the velocity of the projectile with the distance passed over, we can find the pressure upon the shot's base throughout any distance where this law holds good. From the relation

$$v = f(u), \quad (1)$$

where  $v$  is the velocity of the shot when it has travelled the distance  $u$  in the gun, we have

$$m \frac{dv}{dt} = f'(u) \cdot \frac{du}{dt} \cdot m = P; \quad (2)$$

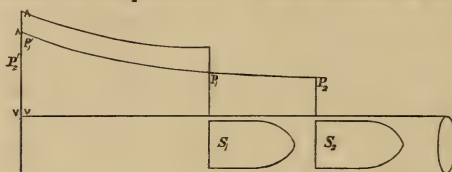
in which  $P$  is the total pressure on the shot's base, and  $m$  is the mass of the shot. The form of the function  $f$  in (1) which is reached in Sarrau's Effects of Powder in Guns is not complex for calculation; and, though an impartial critic (among whom M. Sarrau ranks himself) cannot, perhaps, be satisfied with all the steps necessary for its establishment, yet no candid person who has examined the numerous applications of this formula to practice given in Sarrau's work and elsewhere can refuse to believe that it gives, between certain limits, a close approximation to the true law connecting velocity with space passed over. This fact being established, it follows that (2) gives the pressure as far back towards the chase from the muzzle as (1) can be held to be true.

It is to be noted that the velocity which will be used in (1), probably in the way of the calculation from experimental results of the constants which it contains, is, as has already been remarked, slightly too great; and consequently the pressure which we shall derive from (2) will probably be too small. Also, the value of the pressure derived from (2) is, assuming (as we cannot do better) the velocity to be the true value of the velocity which the shot had at the instant its base cleared the muzzle, the pressure upon the shot's base at that point. And similarly, the value of  $P$  derived for any particular value of  $u$  is the pressure upon the shot's base. It remains to examine whether this is the greatest pressure which acts at the point considered during the phenomenon of explosion, for this greatest pressure is what the gun-maker wishes to ascertain.

Suppose then we have found a certain pressure  $P_1$  at a point  $u_1$ , from (2). The pressure in the gas as we pass backwards to the breech from  $u_1$  must increase, because the velocity of the gas decreases. We have then some pressure  $P'_1$  at the breech which is greater than  $P_1$ . The difference between  $P_1$  and  $P'_1$  is not known, but the latter is generally estimated to be from 25 to 50 per cent. the greater. Nor is the form of the line of pressures\* connecting  $P_1$  and  $P'_1$  known; but it is extremely improbable that it is concave towards

\* This line evidently depends upon both the density of the gas, and upon the rate of formation of gas. Its correct determination cannot at present be effected.

the gun. And, if it be not, then, when the shot moves onward from  $u_1$ , the pressure at that point falls. This is illustrated in the diagram,



where  $S_1$  and  $S_2$  are two positions of the shot, and  $P_1$  and  $P_2$  the corresponding pressures on its base. Thus the pressure found by the insertion of any value of  $u$  in (2) is the greatest pressure which occurs at that point.

In Sarrau's *Effects of Powder in Guns* we find, p. 167, (6)

$$f(u) = Ru^{\frac{3}{2}}(1 - Su^{\frac{1}{2}}), \quad (3)$$

where  $R$  and  $S$  are constants in the case considered (the reference here given is to *Proceedings of the U. S. Naval Institute*, Whole No. 28, in which a translation of Sarrau's work will be found). This equation requires for the determination of its two constants, two firings under identical conditions of loading, and with differing lengths of bore. For this end it would be sufficient to have a gun with a muzzle piece which could be removed. There are other useful and more elastic methods of using Sarrau's equation (6) just referred to which will be found fully explained in his work. One of these is exemplified in *Elastic Strength of Guns*, published by the Naval Academy.

In cases where it may be impossible to determine the constants in (3), Sarrau, in his *Formule Monome des Vitesses dans les Armes*, page 7, proposes the two formulæ,

$$f(u) = Au^{\frac{2}{3}}, \quad (4)$$

for ordinary powders, and

$$f(u) = Bu^{\frac{1}{4}}, \quad (5)$$

for very slow-burning powders. In these expressions  $A$  and  $B$  are constants in the case considered. They are necessarily less accurate than (3); but, since they contain each one constant only, the single datum of the muzzle velocity and length of travel of the shot in the bore is sufficient for their determination. Numerous applications of the expressions in (4) and (5) to practice in differing conditions will be found in Sarrau's work: the results are very satisfactory.

For the VIII.-inch B. L. R., loaded with 125 pounds of cocoa powder and a 250-pound projectile, we have, in (3)

$$R = 825.85,$$

$$S = 27.428;$$

and in (5)

$$B = 1014.1$$

The units here are feet, pounds, and seconds. The value of  $B$  is quickly derived from the data that the length of travel is 16.41 feet, and the velocity 2041 f.s. The method of determining  $R$  and  $S$  it is not necessary to give here. In order to compare the pressures given by the monomial with those given by the binomial expressions, the points given below were calculated, with the results stated:  $u$  is in feet, and  $P$ , the pressure, in pounds per square inch.

* $u$ .	$P$	
	from (5)	from (3)
16.41	9802	11600
14.	10610	12500
8.	14040	17500

The accuracy, though not as close as could be desired, is yet tolerable. The pressures given by (5) are smaller than those given by (3), by .18, .18, .20 of themselves. The equation (3) would of course be used whenever the two constants could be determined; and so closely does it agree with the results of practice when  $u$  is widely varied, that its credibility must be held to be of a high order.

In all cases, after a pressure curve is drawn by the method above, in the neighborhood of the muzzle and chase, and near the breech by methods given in Sarrau's work, and exemplified in Elastic Strength of Guns, already referred to, we have a valuable check on it, in that the area under it ( $BH KC$  in the first figure) must be equal to the muzzle energy of the shot. For it is evident that the curve of pressures with which we are dealing is the locus of those pressures which have given the shot motion. If we could ascertain the locus of the mean pressure in the gaseous mass behind the shot at each instant, the area under this second curve would be the whole work done in the gun on the charge and projectile. In two separate and distinct pressure curves which the writer of this article laid down conjointly with Lieutenant R. R. Ingersoll, U. S. N., this check was used by applying Simpson's Rules to the calculation of the area under the former curve, and was found to satisfy with remarkable accuracy.

\* The point from which  $u$  is measured is the seat of the base of the shot, and 16.41 feet is its value when the base of the shot is at the muzzle.





NAVAL INSTITUTE, ANNAPOLIS, MD.

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THE PROPOSED ABOLITION OF THE ASTRONOMICAL  
DAY AND ITS BEARING ON PROBLEMS  
OF NAVIGATION.

BY PROFESSOR STIMSON J. BROWN, U. S. N.

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With the growth of commerce and the vast extension of telegraph and railroad systems, the necessity of a reform in the usual methods of time-reckoning has made itself forcibly felt. This has expressed itself in various attempts to adopt systems of standard time which should embrace as wide an extent of longitude as possible, and at the same time vary but little from the local time of any place using one of these systems. Thus it was a comparatively easy matter for Great Britain in 1848 and Sweden in 1879 to adopt as legal standard times, the mean solar day beginning at midnight of the meridian of their respective government observatories. The solution of the problem in the United States and Canada has been more difficult, on account of their wide extent in longitude. Yet, at a railway time convention in 1883 a system was adopted, and shortly after carried into execution, which system embodies all the essential principles necessary for uniformity in the chronology and time-reckoning of the ordinary affairs of life. It will be remembered that this plan divided the two countries into districts by meridians one hour of time apart; that the division into districts was so made that the central meridian of each is an integral number of hours west of the Greenwich meridian; and that from the central meridian of each district the standard time of the whole district is to be reckoned.

In continental Europe, with railroad, telegraph and postal routes extending through different countries separated by purely artificial boundaries, the inconvenience has been even greater than in the United States; but national pride and jealousy have proved serious obstacles to systematic reform. Chief among these has been the necessity, in any thorough reform, of the selection of an initial meridian which would be universally recognized.

Out of the discussion which these attempts have involved, has developed the idea of a universal day. Such a day would begin, for the whole world, at a given instant of time at the initial meridian; but by this scheme the various epochs of the day would begin one hour later for each hour of longitude to the west, and there has been no serious attempt to adapt it to the practical affairs of everyday life. The railway time system of the United States is only a simple modification of this idea. With standards of time carried out for the whole world on this system, the process of finding the universal date and time would be a very simple one, and the variation of local date and time reduced to a simple rule.

The necessity of a universal prime meridian, met in all the proposed plans for securing uniformity in time-reckoning, has always been urged by seafaring men for a different purpose. It is not necessary to more than refer to the utility and convenience to navigators of the adoption of a universal zero point from which to reckon longitude. The need of this has been a prominent factor in the success of the movement towards uniformity in the methods of time reckoning.

The various commercial and scientific societies of Europe, in which these questions have been discussed, have from time to time suggested the United States as the most favorable nation, for obvious reasons, for taking the initiatory steps in calling an international conference for selecting this prime meridian. The subject, in this country, had been so generally discussed and the utility of the proposed reforms so generally recognized, that Congress, in 1882, passed an act authorizing the President to call an international conference for the purpose of carrying the project into execution. After the arrangement of the necessary diplomatic preliminaries, the Conference met in Washington, in October, 1884. All its acts are of special interest to nautical men, one of them proposing no less radical a reform than the abolition of the astronomical day.

The second resolution reads as follows: "That the Conference proposes to the governments here represented the adoption of the meridian passing through the center of the transit instrument at the Greenwich Observatory, as the initial meridian for longitude." The vote of San Domingo was the only negative vote; the delegates from France and Brazil abstained from voting.

The third resolution was, "That from this meridian, longitude shall be counted in two directions up to 180 degrees, east longitude being

plus and west longitude minus." This reversal of the uniform custom of navigators in regard to the sign for the application of longitude arose from its application in reducing universal time to local time ; it is of little importance to navigators, as the precepts for its application to local or Greenwich time are too simple to cause any confusion as to the meaning of the resolution.

The third and fourth resolutions were in regard to the universal day, defining it as beginning at the moment of mean midnight of the initial meridian, coinciding with the beginning of the civil day and date of that meridian; the hours to be counted successively from 0 to 24.

In the sixth resolution, "The Conference expresses the hope that as soon as may be practicable the astronomical and nautical day will be arranged everywhere to begin at mean midnight."

This resolution, though anticipated, has met with strong opposition from the majority of eminent astronomers, particularly Europe. It is not difficult to see why they should oppose any innovation of the long-established and natural method of counting astronomical time. No one has so forcibly presented the objections from an astronomical point of view as Professor Newcomb ; I therefore quote at length his letter to Commodore Franklin, protesting against the adoption of the new system, January 1, 1885.

"The first of these recommendations proposes a change in the method of counting astronomical time which has come down to us from antiquity. The practice of taking noon as the moment from which to count the hours originated with Ptolemy. This practice is not, as some distinguished members of the Conference seem to have supposed, based solely upon the inconvenience to the astronomer of changing his day at midnight, but was adopted because it was the most natural method of measuring solar time. At any one place solar time is measured by the motion of the sun and is expressed by the sun's hour angle. By uniform custom hour angles are reckoned from the meridian of the place, and thus by a natural process the solar day is counted from the moment the sun passes over the meridian of the place, or over the standard meridian. For the same reason the sidereal day is counted from the moment the vernal equinox passes over the meridian of the place, and thus the two times correspond to the relation between the sun and the equinox.

"It would appear that the Conference adopted the recommendation

under the impression that the change would involve nothing more than the current method of reckoning time among astronomers, and could therefore be adopted without serious inconvenience. . . . .

"A change in the system of reckoning astronomical time is not merely a change of habit, such as a new method of counting time in civil life would be, but a change in the whole literature and teaching of the subject. The existing system permeates all the ephemerides and observations which fill the library of the astronomer. All his text-books, his teachings, his tables, his formulae, and his habits of calculation are based on this system. To change this system will involve a change in many of the precepts and methods laid down in his text-books.

"But this would only be the beginning of the confusion. Astronomical observations and ephemerides are made and printed not only for the present time, but for future generations and centuries. If the system is changed as proposed, the astronomers of future generations who refer to these publications must bear this change in mind in order not to misinterpret the data before them. The case will be yet worse if the change is not made by all the ephemerides and astronomers at the same time epoch. It will then be necessary for the astronomers of the twentieth century, using observations and ephemerides of the present, to know, remember, and have constantly in mind a certain date different in each case at which the change was adopted. . . . .

"It is difficult to present to others than astronomers who have used the published observations, the confusion, embarrassments and mistakes that will arise to their successors from the change. The case can be illustrated by saying that it is of the same kind—though in less degree than—the confusion that would arise to readers and historians in the future, if we should reverse or alter the meaning of a number of words in our language, with a result that the reader would not know what the words meant unless he noticed at what date the book was printed. . . . .

"The change will affect the navigator as well as the astronomer. Whether the navigator should commence his day at noon or midnight, it is certain that he must determine his latitude from the sun at noon. The present system of counting the day from noon enables him to do this in a simple manner, since he changes his own noon into the astronomical period by the simple addition or subtraction of his longitude. To introduce any change whatever in the habits of

computation of uneducated men is a slow and difficult matter, and is the more difficult when a complex system is to be substituted for a simple one. I am decidedly of the opinion that any attempt to change the form of printing astronomical ephemerides for the use of our navigators would meet with objections so strong that they could not be practically overcome."

The objections from an authority of such eminence in astronomical matters seem to be shared by the majority of astronomers in Europe; but it should be noted that these objections are raised only in so far as they affect astronomers and their work. At the last meeting of the *Astronomische Gesellschaft* (at Geneva, in August, 1885) the discussion of the 6th resolution of the Conference was limited by the emphatic declaration of the President to its consideration from a purely astronomical standpoint; thus limited, although no formal resolution of the society was adopted, a large majority expressed themselves as opposed to the change. Those speaking in favor of the change were, however, among the most eminent astronomers of the society; they recognized the difficulties it would entail to astronomers, but were willing to make the sacrifice for the sake of gaining uniformity in methods of reckoning time; to these may be added Professor J. C. Adams, of Cambridge, Professor Christie, Astronomer Royal of Great Britain, as well as Professor Oppolzer, of Germany. The last-named proposes to give practical effect to his views by adopting the new reckoning in an extensive list of solar and lunar eclipses which he is now preparing for publication. Professor Adams pointed out in the proceedings of the Conference that there were noted exceptions even to the universality of the old method; such, for instance, as Delambre's Tables of the Sun, Burg's, Burkhart's and Damoiseau's Tables of the Moon; Bouvard's Tables of Jupiter, Saturn and Uranus; in all of which mean midnight is used as the epoch of the tables. Also La Place in his *Mecanique Celeste* uses Paris mean midnight as the origin of the astronomical day.

American astronomers have been as unanimous in favor of the change as those of Europe against it. Shortly after the conference, Commodore Franklin, Superintendent of the Naval Observatory, sent out a circular letter soliciting expressions of opinion on the subject. So far as I have been able to learn, with the exception of Professor Newcomb's letter above quoted, favorable answers were returned. Most of them, however, and this may be said of all who favor the change, advise waiting until a certain date can be fixed



upon by international agreement. Nautical almanacs are published, or in course of publication, up to 1890; and the change could not well be carried into effect before that date. Professor Tietjen, who directs the publication of the *Berliner Jahrbuch*, has said that in his opinion such a change would not find place there before 1900. Thus it will be seen that astronomers are about evenly divided as to numbers, if not as to ability.

It may be mentioned here that the change was formally adopted at the Greenwich Observatory, January 1, 1885, thus initiating the confusion liable to arise from the selection of different dates for the inauguration of the change, the dangers of which are so forcibly pointed out in Professor Newcomb's letter. At the same time the adoption of this action by so prominent an observatory will tend to compel its ultimate adoption by all.

An examination of the opinions of astronomers will lead, I think, to the conclusion that those astronomers who are chiefly engaged in combining and discussing the vast mass of observations from various sources and widely different times, are generally opposed to any change; while those who perform the practical work of making the observations are as unanimous in its favor. To the latter the change would be a simple one, and give rise to little or no inconvenience. To the former the inconveniences introduced and the liability to error would be felt for a long time. It would seem, though, that they to whom the change might prove burdensome, are fitted by their skill, education and training to avoid the mistakes to which there would be liability.

However, it is not the purpose of this article to discuss the opinions of astronomers, or the effect such change would have on purely astronomical work, but rather to call the attention of naval officers and nautical men generally to the effect it would have on the various problems of the navigator; whether it will introduce, as Professor Newcomb says, a complicated system for a simple one, and consequently cause liability to errors, or whether it will be a gain in simplicity by avoiding the use of the two dates aboard ship, one for the log and one for the navigator. These are questions which the education and experience of naval officers ought to fit them to discuss. If the discussion leads to a general expression of opinion by intelligent navigators that the change will introduce more simple and direct methods, then the opinions of the uneducated navigator, whose opposition Professor Newcomb predicts, ought not to stand in the



way of its adoption. It is to be expected that they would object to any change in their habits of computation, no matter for what ultimate gain; if, on the contrary, the change introduces methods which, although simple to educated men, would perplex and confuse those of little mathematical education, these objections ought to be respected.

At the first glance it would seem to be self-evident that the use of two dates to represent the same instant of time, and the necessity of reducing the civil date of the ship's log to the astronomical date of the Nautical Almanac, is not a simple system, and would be attended by liability to error. I think it will be found that navigators of considerable experience have at times made mistakes in taking data from the almanac, by confusing the two dates. Yet, on the other hand, in nearly all the methods of finding a ship's position at sea, or the chronometer error by observations on shore, the hour angle of a celestial object from the upper meridian is either directly the result of the computation, or is used in the computation for finding some other required quantity. Under the proposed system the hour angles obtained would have to be reduced to the lower meridian, or from the lower to the upper meridian to be used in the computation. Whether this reduction would be attended by as much inconvenience and liability to error as the simple process of changing the date, ought to be discussed. It should be considered what changes in the precepts and rules contained in all works on nautical astronomy, and in the tables employed, will be necessary to make perfectly plain to the thumb-rule class the transition to the new system.

A general idea of this can be obtained by an examination in detail of the various problems of navigation. By far the most frequently used are those involving observations of the sun: 1st, for latitude by meridian altitude; 2d, for longitude by time sight; 3d, for latitude by off-meridian sights; and 4th, for latitude by circum-meridian altitudes. Observations of the moon, planets and stars, for latitude or longitude, though comparatively infrequent, are generally used only on those times when observation of the sun has been impossible and it is important to find an approximate position of the ship. On such an occasion, a serious error due to the changed methods might be disastrous. It will first be noticed as a factor in every problem that the Greenwich date and time would be indicated simply by the application of the longitude to local date and time; that the latter is the civil date and time, except that the P. M. hour must be increased by twelve hours. Under the present method, the civil date and time are

first reduced to local astronomical date and time, by adding twelve hours to the A. M. time, and decreasing the number indicating the civil date by a unit, for forenoon time ; for P. M. time the date and time are shown immediately by the civil date and time. The change substitutes the simple rule that there is but one date, and that is the civil or local date.

The tabulated data for the first problem, finding the latitude by a meridian altitude of the sun, are given on page I. of the Nautical Almanac, for Greenwich apparent noon ; for obvious reasons, this could be advantageously left as it is, the navigator bearing in mind only the fact of the coincidence of civil and astronomical time. The use of page I. is confined almost to this one problem, and the data when used for other purposes only required approximately. In all other cases, and perhaps in this, the data would be tabulated, in accordance with the new system, for Greenwich mean midnight, or for times reckoned from that instant.

In the second problem, the data would be taken from page II. of the Nautical Almanac and corrected for the G. M. time of observation ; the hour angle would be found from the usual tables ; the only change would be in the addition of twelve hours to the hour angle resulting from an afternoon sight, instead of that from the forenoon sight.

In the third problem, the hour angle of the sun would be required for the computation ; this would be found for an A. M. sight, by subtracting the L. A. time from twelve hours ; for a P. M. sight, by subtracting twelve hours from the L. A. time. Here again a simple change in an old precept is made.

The hour angle required in the fourth problem, to reduce the altitude of the sun to meridian altitude, would be found as before, by comparing the Greenwich time of observation as shown by the chronometer with the Greenwich mean time of apparent noon. The only difference being that noon occurs at 12 hours instead of at 0 hours, as before.

So far as these problems are concerned the changes are very simple ; in those involving observations of the moon, planets or stars, the effects of the changes are not so obvious, involving, as they do, changes of hour angle into sidereal time, and the reverse. In time sights of these bodies, the data required from the Nautical Almanac would be found and corrected for the Greenwich mean time of the observation, as before. The resulting hour angle simply designated (in hours, minutes and seconds) as east or west of the meridian,

would be reduced to the lower meridian by subtracting it from or adding it to 12 hours, according as the observation was east or west of the meridian. This hour angle would be converted into local sidereal time and this again into local mean time, by the usual formulae.

In all other problems in which the hour angle of these bodies is required for the computation, it would be found, as before, by subtracting the right ascension of the body from the local sidereal time; this hour angle, though, is referred to the lower meridian; it would be reduced to upper meridian by subtracting it from 12 hours for an observation east of the meridian, by subtracting 12 hours from the hour angle for an observation west of the meridian.

The following precepts would be found sufficient to make plain the use of the Nautical Almanac and the necessary tables with the origin of the astronomical day at midnight:

I. The astronomical day begins at mean midnight, and coincides with the civil day and date; the hours are counted successively, beginning at midnight from 0 to 24.

II. All data of the Almanac are given for the astronomical date and time as defined in I.

III. The local astronomical time is given directly by the civil time in the forenoon; in the afternoon, by the addition of 12 hours to the civil time.

IV. All hour angles resulting from observations of the moon, planets or stars, expressed simply as east or west hour angle, are to be reduced to the lower meridian by subtracting the east hour angle from 12 hours, or by adding 12 hours to the west hour angle.

V. Hour angles thus reduced are to be reduced to local sidereal time by the addition to the hour angle of the right ascension of the body for the Greenwich mean time of the observation.

VI. Local sidereal time is reduced to local mean time, as follows: Subtract from the local sidereal time the right ascension of the mean sun for Greenwich mean midnight of the given date plus the correction for the Greenwich mean time; or subtract from the local sidereal time the right ascension of the mean sun for Greenwich mean midnight corrected for longitude; the resulting sidereal interval is corrected as usual by Table II. of the American Ephemeris, or any other table for converting sidereal into mean time interval.

VII. To reduce local mean time to sidereal time, add to the local mean time the right ascension of the mean sun for Greenwich mean midnight of the given date, corrected for the Greenwich mean time.

VIII. To find the hour angle of a body, for use in computation :

1. For the sun : for a forenoon sight, subtract the local apparent time of observation from 12 hours ; for an afternoon sight, subtract the local apparent time from 12 hours.

2. For the moon, planet or star : find the local sidereal time by VII. ; from the local sidereal time subtract the right ascension of the body observed for the Greenwich mean time of the observation ; the result is the hour angle from the lower meridian. For an observation east of the meridian, subtract this result from 12 hours ; for an observation west of the meridian, subtract 12 hours from the result.

It will be readily seen that they affect the whole literature of nautical astronomy. The changes, taken by themselves, are not difficult to understand ; yet any one using the existing text-books on the subject would be obliged to make in them the changes necessary to adapt them to the different origin of reckoning time ; a difficult thing for one to whom the subject is a new one. Or, studying them as they now are, he would be obliged to change important precepts which had been learned with difficulty. To rightly estimate how difficult this would be, one must look at it not from the standpoint of the skilled navigator, but as one to whom the subject of nautical astronomy is full of perplexities.

It is easy for one who has a thorough knowledge of the theory of the subject to make the necessary precepts for himself, or to readily see the bearing of new ones given for the use of tables under the new system ; but would the majority of navigators come under this head ?

It may seem trivial and unnecessary to examine in detail all the problems of nautical astronomy to see what effect general changes would produce ; yet it serves to show that the meridian of the place is the natural origin to which are referred the various quantities used in or derived from the computations ; by this the problems are simple and direct. It is for this reason that the nautical or astronomical day is the most convenient ; that it is made to begin at noon. To change its beginning to midnight is only an apparent gain in uniformity. It is not designed for the purpose of chronology, and is not so used ; and there is no reason why it should coincide with the day used for that purpose. The civil day is used aboard ship in all cases when it is most suitable ; the nautical day only by the navigator in those problems of navigation where it simplifies astronomical calculation. As such, its retention would not conflict with the purposes of those who aim to secure uniformity for chronological and commercial purposes.

NAVAL INSTITUTE, ANNAPOLIS, MD.

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NOTES ON THE LITERATURE OF EXPLOSIVES.\*

By CHARLES E. MUNROE.

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No. IX.

The blowing up of Flood Rock was successfully accomplished October 10, 1885. The official report is not yet issued, and hence the following account has been compiled from various sources of information. Flood Rock had a superficial area of nine acres, about 250 square feet of which was above water. The rock consisted of hornblende gneiss, with intersecting cross-veins. A sea-wall seven feet high was built around the island, and two shafts were sunk, one sixty-seven and the other forty feet deep. The main shaft was used for removing the excavated rock in blasting out the headings. The smaller shaft was used for the tubes conveying the compressed air which drove the drills. The first series of headings branched out from the main shaft at a depth of forty feet, and from the bottom of the shaft another series diverged directly under those above. The headings branched at right angles every twenty feet, and were sixty in number in each tier. The double system of headings was employed to gain a sufficient depth after the explosion without the necessity of dredging out to the extent that was found necessary at Hallet's Point. The total length of tunneling was about four miles, consisting of twenty-four galleries running north and south and forty-six running east and west. The longest of these was 1200 feet in length, 6 feet wide and 10 feet high. There was a thickness of from 10 to 25 feet between the roof of the top tier of galleries and the water. There were 467 pillars left to support the roof; these were 15 feet square. The whole rock was honeycombed with tunnels, about 80,000 cubic feet of rock having been removed.

\* As it is proposed to continue these Notes from time to time, authors, publishers and manufacturers will do the writer a favor by sending him copies of their papers, publications, or trade circulars.



There were drilled in the pillars and roof 13,286 chambers for holding the cartridges, each chamber being three inches in diameter and about nine feet deep. These chambers were filled with rackarock\* cartridges, of which there were about forty-seven thousand used, each being two and a half inches in diameter and two feet in length, and containing about six pounds of the explosive. In addition to the rackarock cartridges, several hundred ordinary dynamite cartridges were used, to which the wires leading to the firing batteries were attached. The shock resulting from the explosion of these dynamite cartridges caused the explosion of the rackarock. Upwards of two hundred and eighty-five thousand pounds of explosives were used in the charge.

The wiring in the mine was divided into thirty-six circuits, the batteries attached to these circuits being stowed in a tool-house on the rock. The wire of the primary circuit which actuated the electromagnet that closed the secondary circuits was led across to the Astoria shore on the morning of the explosion. The firing-key was about 1200 feet from the mine.

Two siphons, one twelve inches in diameter and the other three inches, were set at work at 10 A. M., October 9, flooding the mine, and they completed their work early the following day. The first effect of the explosion was to produce a rumbling noise, and then to project a mass of water over an area of about 1200 square feet to a height of about 150 feet. Masses of rock rose in the midst of this water to a height of from 40 to 50 feet. The explosion lasted about 30 seconds. As the water fell a dense cloud of yellowish smoke arose and floated over the Astoria shore.

Observations were made in many places, at various distances about the centre of the explosion, on the time of arrival of the terrestrial and aerial disturbances, and they showed that the terrestrial effect was apparent as far south as Princeton, N. Y., and as far east as Cambridge, Mass., and, as was to be expected, that the terrestrial impulse was in advance of the aerial, at least at the stations near at hand. The rate of transmission cannot be stated until these observations are reduced.

After the explosion the rock appeared undisturbed, though on close examination it was found to be somewhat fissured. However, it slowly settled, and by October 13 the entire rock was below water. It was not intended that the rock should be broken very fine, since

\* Proc. Nav. Inst. 9, 755 ; 11, 281.



with the appliances at hand pieces of from ten to fifteen tons in weight could be most economically handled. The work has been in operation about nine years, and has cost upwards of 1,000,000 dollars. The cost of removing the broken rock is estimated at 600,000 dollars, and two years' steady labor will be required. The channel will then have a depth of 26 feet over an increased width of 600 feet.

In an interesting article in the *Jour. Military Service Inst. of the United States*, 6, 103, 1885, entitled "Recent Progress in High Explosives and their Uses in War," General H. L. Abbot, after resuming the results of recent experiments at Willet's Point, says the use of high explosives in shells, although attempted very shortly after the discovery of dynamite, is still in the experimental stage, because no certain mode of regulating the time of explosion has yet been discovered. When this has been accomplished, certain advantages will result. For field guns these advantages will chiefly come from thicker and heavier shells, broken into more numerous and regular fragments, and available for longer ranges than at present. For medium calibres, such as are used in sieges and bombardments, the shell capacity is necessarily too small to carry decisive charges, and the effects will be moral rather than physical. This is due to the intensely local action of these high explosives. The terrifying sound and frightful effect upon the object struck will perhaps appal new troops, but old soldiers will soon learn that the bark is worse than the bite. For the much larger calibres used in coast defence, it is stoutly claimed that charges of a size to be destructive in themselves may be employed even against armored ships; and experiments in this direction are now exciting so much interest that a brief résumé of what has been established both in respect to the possibility and to the utility of such firing, may not be unacceptable.

In Sweden,\* in September, 1867, within a year of its invention, seventeen shells, each charged with 1.65 pounds of dynamite, were fired from an 18-pdr. howitzer loaded with about two pounds of gunpowder. No premature explosion occurred. In Norway\* in the winter of 1870-71, some trials were made with a 6.8-inch Krupp gun. At first the shell was packed full of dynamite. Several preliminary shots were successful, but when the charge was increased to 1.65 pounds of gunpowder the shell burst in the bore. Continuing the same trials, shells filled with water, and primed with an ounce of dynamite

\* Memorial de l'Officier du Genie, 20, 243 and 244.

in a copper extension of the fuze plug, were fired with full charges without accident. During the siege operations of the 2d Corps of the Army of Versailles,\* in May, 1871, two shells charged with dynamite were fired without accident into the hostile lines; one was from a 24-pdr. howitzer and the other from a mortar. The dynamite was enclosed in a rubber bag held in position with gunpowder, and was ignited by a time-fuze in both instances.

These facts, and many others which might be cited, sufficiently prove that the use even of dynamite in shells has never been regarded as impossible; but the selection of a high explosive so sensitive to violent shocks, when others so much safer are known, is certainly not to be recommended at this late day.

Fairly successful trials with picric powder were made in England about fifteen years ago, but they were discontinued in consequence of the more favorable results with wet gun-cotton. The first trials with gun-cotton in the dry state were made many years ago, and a 7-inch Armstrong was thus burst by an explosion in the bore. Wet gun-cotton has succeeded better, and in England safety of firing and a good arrangement for effecting the explosion after impact are claimed. Folger's† successful experiments in firing gun-cotton are also cited, but the author regards those with explosive gelatine as more promising. "Should the trials with this fail, the Sprengel group will naturally receive attention. Gruson in Germany has been working in this direction for three or four years. He uses strong nitric acid in one compartment, and dinitrobenzol in another. The shock in the gun or the shock at impact, as desired, effects the combination, and explosion is caused by a fuze in the base of the shell.

"Assuming that artillerists will ultimately succeed in devising methods (1) for preventing premature explosions in the bore, and (2) for effecting explosion at the instant desired, the next question to decide is, what changes are needful to destroy the armor of modern ships of war. If this could be accomplished with moderate charges, armor-plating upon the sea would soon become as historical as the coats of mail in the Tower of London. But here an important distinction is to be observed. We already know that if the charge can be imbedded in the armor, quite moderate amounts will be effective. Popular belief attributes equal power to charges exploded in contact, or nearly so, with the plates at their outer surface. Unfortunately this is a grievous error."

\* *Loc. cit.* p. 246.

† Van Nostrand's Eng. Mag. 32, 1, 1885.

The author then discusses the possibility of crushing the armor of a modern ship of war by means of exterior charges, using as his criterion the formula deduced by the Scandinavian Commission,\* which he deems at present our safest guide when estimating the charges necessary to produce this effect, assuming them to be exploded in contact with the plating near or even below the water surface; and he concludes: "But what calibres of guns must we have to project the charges it indicates, varying from 80 pounds for 5-inch armor, to much larger amounts for that usually carried? The capacity of a 10-inch common shell is about 25 pounds; of a 12-inch common shell, about 40 pounds; and of a 16-inch common shell, such as is now fired from guns weighing 100 tons and upward, about 75 pounds. Battering projectiles for armor carry about one-third these weights. Clearly it is quite impossible to project the needful charges, and we have little hope either now or hereafter from exterior explosions against armor-plating. High explosives with all their wonderful power must either be carried deeply into the iron before explosion or they will fail to do much damage. But to secure this penetration, initial velocities of 2000 feet and the best steel shells thus far achieved are demanded; and even then guns of less calibre than 12 inches will be of little avail. Of course such a standard will have to be approached gradually in the trials; but by appreciating at the outset the full magnitude of the problem, unprofitable labor will doubtless be avoided."

In the same number of this Journal, p. 170, is an unsigned review of the article, by the compiler of these Notes, in *Van Nostrand's Eng. Mag.* 32, 1, 1885, in which, after practically admitting the conditions of efficiency as set forth by us, the writer adds, "Bearing in mind that the *muzzle energy* of the 100-ton gun is about 60,000 foot-tons, and that this appears to suffice to break up anything but the *thickest* steel armor, it is still an open question whether full penetration with a small charge (which is liable to simple ignition) is better than the full detonation on the surface of a much larger charge, that charge being, however, suitably *tamped* both by the character of its enveloping shell and several hundred foot-tons of remaining energy of the projectile upon striking. Even a partial initial penetration would use up some of this probable tamping due to its energy and lessen the effect on the target by the explosion.

\* Proc. Nav. Inst. 7, 121, 1881.

"In a field so novel, experiment can only satisfactorily demonstrate the possibilities. So far, the simple placement of a large charge of dynamite against a heavy armor plate, and then exploding it, *entirely untamped*, does not appear to be conclusive as to what that same charge will accomplish when hurled against the plate with a striking energy of several hundred foot-tons, the charge being encased in a shell which affords some resistance to the initial bursting efforts of the gases evolved.

"Considering the very much greater potential of the explosive relative to the possible stored-up work of a projectile, and the undoubted loss of effectiveness on the target of the charge farthest removed, it is an open question whether it is best to use a hard and necessarily *thick* point (thus placing the charge farther away from the point of impact), or using a soft, *thin* point which will "squash-up" upon striking the target and bring the explosive in as close contact as possible.

"It will be seen that a wide field must be traversed before conclusions can be safely drawn. The experiments now in hand will, I trust, determine some of the mooted points. Much will be learnt that will enable us to make the most effective use of the high explosives against an enemy. If successful, we have available a weapon (the air-gun) which will be of value to us, in our present defenceless condition, as a possible stop-gap. Owing to its limitations of range it can never be considered a substitute for the heavy ordnance so much needed. But it will be at all times a valuable adjunct to our defensive appliances.

"It is possible that the *heaviest* armor may withstand the shock of an explosion of a shell containing 100 pounds of explosive gelatine. If that is the case, 500 pounds may be thrown, if required for the work. But it should be borne in mind that a vessel is protected in a very limited portion by this heaviest armor; that its decks, presenting the largest target, are very vulnerable, as was demonstrated by Lieutenant-Commander Folger with the assimilated deck target; that a still wider area of vulnerability is presented in an additional area of the water zone, 16 feet in width, surrounding the ship; if the explosion takes place within this zone, a few feet under the surface, the results are very likely to be fatal."

The writer then discusses the comparison made between the air-gun and the gun used in the Gâvre trials, and claims that the *mean* available pressures, and not the *maximum* pressure, in the gun-

powder gun should be taken as the standard for comparison. Estimating the mean pressure of the Gâvre gun as 12,000 pounds per square inch and the length as 16.1 calibres, while the pressure in the air-gun is 500 pounds to the square inch and its length 120 calibres, we should have a ratio of pressures for guns of equal length of 12000:3725. "But it is proposed to use (in the air-gun) an initial pressure of 2000 pounds, giving (with a flask or reservoir capacity of ten times the bore of the gun) a final pressure of 1820 pounds or a *mean* pressure of about 1910 pounds. With this pressure the comparison would be stated as 12000:14230 in favor of the air-gun, and the projectile from the latter would have the greatest penetrative ability."

The writer also notes that the projectile for the air-gun, as described, differs from that now in use. This is quite to be expected in a course of tentative experiments. He states too that in the firing of dynamite on iron plates, Lieutenant Zalinski used in the first experiment *ten* pounds of untamped dynamite cartridges, and in the second experiment *twenty* pounds of dynamite enclosed in an 8-inch wrought-iron pipe 30 inches in length, the charge being about 10 inches in height and the remainder of the pipe loosely filled with sand and debris.

At the Ann Arbor meeting of the American Association for the Advancement of Science, Commander T. F. Jewell, U. S. N., read a paper on the apparent resistance of a body of air to a change of shape, in which he described some experiments at the United States torpedo station, in which a disk of gun-cotton was exploded on a metal plate. Upon each disk of the explosive had been stamped the letters 'U. S. N.' and the year in which the material had been manufactured. After explosion upon the iron, similar indentations were found upon the plate, as if the air in the indented letters had been driven into the plate.\*—*Science* 6, 207, Sept. 11, 1885.

In the *Proc. Am. Assoc. Ad. Science*, 33, 174, 1885, in a paper by Charles E. Munroe, entitled "Examination of methods proposed for rendering the lighter petroleum oils inexplusive," it is stated that, it having been seriously suggested that alum, sal ammoniac and camphor could be used to render the lighter petroleum oils inexplusive, and it having been found in practice that camphor did

\* *Vide* Proc. U. S. Nav. Inst. 11, 110.



diminish very markedly the readiness with which explosive gelatine or gum dynamite could be exploded, the author has tested the effect of the above bodies by determining their solubility in benzoline; the flashing points of benzoline and commercial kerosene when treated with these bodies and when in their original state; and also the readiness with which mixtures of the oils, in the two conditions, with air could be exploded. The results showed that alum and sal ammoniac were practically insoluble in the oils and produced no effect upon them; that the camphor was soluble, one gram of benzoline dissolving about 1.5 gram of camphor; that an equal weight of camphor raised the flashing point of a kerosene  $12^{\circ}$ ; but that on the other hand the vapor of this camphorated kerosene, when mixed with air, exploded with greater readiness than the original kerosene.

The *Revue d'Artill.* 22, 462, Aug., 1883, under the title, "The Use of Dynamite for Driving Piles," describes a process invented by M. Pradamovic, and put into execution at Pesth. On the centre of the head of the pile he fixes a circular iron plate 395 mm. in diameter and 117 mm. thick. On the centre of this plate he places a dynamite cartridge 157 mm. in diameter and 17.7 mm. high, and weighing 612.5 grams, wrapped in parchment paper. This is detonated by electricity. The effect produced under these conditions is equivalent to that obtained from five blows of a hammer weighing 1475 kilos. falling through three metres.

Gruson, Hellhof and Halbmayer have devised a time-fuze for projectiles, which is ignited by the resistance with which the projectile meets after it is set in motion. For this purpose advantage is taken of the heat produced by the chemical action of water or acid on metallic sodium or potassium. They are placed in separate vessels within the shell, and are brought in contact by the shock. The amount and position of the materials is so arranged that the maximum effect is attained only after a desired interval of time. (*Revue d'Artill.* 21, 567, March, 1882.) The following note shows that the use of potassium as an igniter is not new.

The *Bib. Univ.*, Aug., 1831, describes the method employed by Engineer Lübke in blasting under water. A leaden tube, several feet long and closed at one end, was inserted in a hole in the rock, a cartridge was inserted in the bottom of the tube, and a piece of potassium placed upon the cartridge. The upper part of the tube



was funnel-shaped, and contained a thimble-shaped vessel filled with water, and supported in an upright position by a piece of touchwood, which, by a simple arrangement, would, when burnt, allow the thimble to overturn. The touchwood being set on fire, the workman rowed off to a safe distance and waited the event. The thimble being overturned, the water inflamed the potassium and the latter the powder. It was found that the powder must be very dry or the potassium would not inflame it. Common gunpowder was generally too damp.—*Am. Jour. Science*, 22, [1], 354, 1832.

E. Turpin, of Paris, has recently patented in England an explosive formed by mixing 80 parts of potassium chlorate with 20 parts of gas tar which contains from 1 to 10 per cent. of an absorptive substance such as infusorial earth, charcoal, and the like. One part of the chlorate can be replaced by permanganate.—*Bericht. Deutsch. Chem. Gesell.* No. 1, 1884, Patente 35.

In an abstract from the *J. Soc. Ch. Ind.* 3, No. 2, 132, describing kieselguhr and its practical applications, it is said that the finest earth is found at Traterleuss, between Hamburg and Hanover, Germany. From this dynamite has been made containing 82 per cent. of nitroglycerine. It has been used for the purpose of disinfection, in the form of sticks saturated with bromine, and a patent has been taken out for the use of kieselguhr as an absorbent for concentrated sulphuric acid to facilitate transportation without leakage or loss. When the acid is desired for use it is to be extracted by water.—*J. Am. Chem. Soc.* 6, 140, April, 1884.

According to the *Annales Industrielles*, M. Michalowski, an engineer at Montceau-les-Mines, has invented a new explosive. It is a powder with a density little more than half as great as that of ordinary powder, with irregular grains of a slate-gray color. It does not explode by the action of fire, and detonates only under a blow, like dynamite.—*Jour. Frank. Inst.* 87, 315, 1884.

The London *Times* announces that a new explosive,\* known as hellhoffite, which has been invented by Hellhoff and Gruson, has been subjected to comparative trials at St. Petersburg, together with nitroglycerine and ordinary gunpowder. It is a solution of a nitrated organic compound (naphthalene, phenol, benzene, and the like), in fuming nitric acid. In preparing the hellhoffite tried in the experi-

\*Proc. Nav. Inst. 8, 450.

ments, dinitro-benzene, a solid, inexplusive, and badly burning body, was used. At the first trial glass bottles of 20 cubic centimetres each, were filled with 20 grams of the respective explosive substances and corked. A primer of fulminate of mercury was passed through the cork, a slow match being attached to the outer end of the tube for the purpose of ignition. Each of the bottles thus prepared was placed on a truncated cone of lead, the upper diameter of which was 3.5 centimetres, its lower 4.5, and its height 6. The cone itself stood on a cast-iron plate 2.5 centimetres thick. The deformation of the leaden cone by the action of the explosives could consequently be taken as a measure of their respective destructive power. The explosion of the gunpowder, as was anticipated, caused no changes. By the explosion of the nitro-glycerine the cone was compressed about a quarter of its height; its surface had assumed the appearance of a well-worn hammer: the diameter of the surface had been increased to 5.5 centimetres. The explosion of the hellhoffite caused much greater changes. The surface of the cone was completely torn; pieces five centimetres long and two centimetres thick were torn off and thrown about for several paces; only half of the cone was still a compact but entirely defaced mass. At the second experiment bottles (of 25 grams each) filled with the various explosive substances were let into corresponding cavities bored into the face of fir blocks of similar dimensions. In exploding the gunpowder the block was torn into four pieces as if split with a hatchet, the several pieces were thrown about for 18, 12, 11, and 10 paces. In exploding the nitro-glycerine the block was split into several pieces. The upper portion of the block, as far as the bottle was let into it, was torn off transversely to the direction of the fibre in such a manner that a smooth cut was formed. The explosion of the hellhoffite likewise tore the portion of the block surrounding the bottle transversely to the direction of the fibre, and splintered the remainder of the block into a large number of thin fibres. The following experiments were also made with hellhoffite alone. A slow match was passed through the cork, as far as the surface of the hellhoffite in the glass bottle; no explosion followed on igniting the slow match. A quantity of hellhoffite poured into a bowl could not be exploded by a lighted match. Finally, a few drops of hellhoffite were poured on an anvil and exposed to heavy blows with a hammer, and no explosion followed. The hellhoffite, consequently, possesses the following advantages: (1) When detonated by fulminate of mercury it acts more powerfully than nitro-glycerine;

(2) it may be stored and transported with perfect safety as regards concussion, as it cannot be exploded either by a blow or a shock, nor by an open flame. On the other hand, it has the following disadvantages: (1) Hellhoffite is a liquid; (2) the fuming nitric acid contained in hellhoffite is so volatile that it can be stored only in perfectly closed vessels; (3) hellhoffite is rendered completely in-explosive by being mixed with water, and consequently cannot be employed for works under water.

In General Abbot's *Report on Submarine Mines*, page 252, it is stated that "Franklin in his Letters on Electricity (June 29, 1751), was the first to suggest the employment of frictional electricity for ignition of gunpowder. In 1831, Moses Shaw, of New York, made the first actual application of this method to the explosion of mines. The practical difficulties arising at that date from defective insulation of the apparatus, and especially of the leading wires, were so serious that attention was directed to the heating of a fine platinum wire by a current of voltaic electricity, and that method soon superseded all others. A sketch, found among the papers of the late Samuel Colt, of Hartford, . . . . . which bears date of 1836, indicates a method of firing the torpedoes at will, by the use of a fine platinum wire to be heated by a battery; and in his grand experiment upon the Potomac in 1843 he blew up a brig under full sail with a battery placed in Alexandria, five miles distant. The first application of electrical ignition in civil engineering was made by Sir Charles Pasley of the Royal Engineers, who, in 1839, successfully used low tension fuzes in the removal of the wreck of the Royal George at Spithead. He employed a form of the Daniell battery—which was invented by Becquerel in 1829, and reinvented by Daniell in 1836."

In the historical address delivered by Sir Frederick Abel before the Institution of Civil Engineers, and reprinted in these Proceedings,\* under the title "Electricity Applied to Explosive Purposes," no reference is made to Colt's experiments, and it is stated that "the first practical application of the voltaic battery in this direction was made about forty-five years ago (1838), by French military engineers," but otherwise he agrees with Abbot. Both of these authorities, however, seem to be unacquainted with the researches of Dr. Robert Hare, of the University of Pennsylvania.

The facts seem to be that Mr. Moses Shaw, having frequently failed

\* 9, 767, 1883.

in his efforts to blast rocks by the use of a frictional electric machine, applied June 1, 1831, to Dr. Hare for advice and assistance in perfecting his invention. As Dr. Hare had long used his famous deflagrator\* (or voltaic battery) in his eudiometrical experiments to ignite explosive gaseous mixtures, it occurred to him that it could be equally well used for firing gunpowder, and his experiments proved his belief well founded, for he succeeded in firing twelve charges of gunpowder simultaneously at a distance of one hundred and thirty feet from the battery, and he held that "there are no limits to the number of charges which may be thus ignited, excepting those assigned by economy to the size of the apparatus employed." He also added that "it must be obvious that in all cases of blasting under water, the plan of the tin tubes, and ignition by a galvanic (voltaic) circuit, must be very eligible." The igniting wire was of the "smallest size used for wire gauze." The details of these experiments, with method of preparing the cartridges, etc., are given in *Am. Jour. Sci.* [1], 21, 139, August, 1831, under the title, "On the Application of Galvanic Ignition in Rock Blasting."

The use of water in connection with blasting in mines and quarries is said to be rapidly extending in this country and in Europe. A tube filled with water is inserted in the bore hole next the powder cartridge, the tube being of thin plate, or even of paper. The usual tamping follows, and when the explosion occurs the tube containing the water is burst, the explosive efficiency being increased by the presence of the water, and the effect extended over the enlarged interior of the bore hole due to the space occupied by the water-tube. A much larger quantity of the material to be mined or quarried is thereby brought down or loosened with a given quantity of the explosive, while the heat of the explosion converts a portion of the water into steam, which, with the remaining water, extinguishes the flame and absorbs and neutralizes the gases and smoke generated.

The Boston *Journal* of June 30, 1885, records a curious explosion which occurred in Brookline, Mass. On the preceding Sunday a resident of Brookline returned his watch to his pocket rather quickly, and was startled by an explosion, which was followed by others in rapid succession. Before he could remove his clothing it had been burned through to the flesh, making a painful wound. The hand in

\* Ganot's Physics (ed. 1883), p. 728.

which he held the watch was also severely burned. An examination proved the explosion to have been caused by chlorate of potash tablets, which the gentleman was in the habit of carrying loose in his pocket, and which were ignited by the watch being dropped quickly upon them. The composition of troches of chlorate of potassium, according to *Parrish's Treatise on Pharmacy*, p. 880, 1884, is

Chlorate of potassium,	32.50 grams.
Sugar,	124.00
Tragacanth,	6.50
Spirit of lemon,	.65

and manufacturers are warned to avoid trituration and pressure in order to prevent the mixture from igniting or exploding.





# PROFESSIONAL NOTES.

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## DISTRIBUTION OF ARMOR IN SHIPS OF WAR.

THE SUBSTANCE OF TWO LECTURES DELIVERED AT THE ROYAL  
NAVAL COLLEGE, GREENWICH, ENGLAND, 1885,

BY ASSISTANT NAVAL CONSTRUCTOR W. E. SMITH, R. N.

(Reprinted from the Admiralty Report.)

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### LECTURE I.

The subject chosen for our consideration is one of the utmost importance to all of us, to Naval Officers and to Naval Architects alike. The professional reputation of the Naval Architect, and the ability of the Naval Officer to effectually safeguard his country, are intimately associated in this one question of armor distribution.

Ever since the introduction of shell guns capable of sending with a fair amount of accuracy powerful incendiary shell, protection of some kind has become a necessity for every ship called upon to face a well-sustained fire from an enterprising enemy. This protection at first consisted of iron armor, and was looked upon mainly as a means of shielding the men and guns in the batteries against serious casualties, and of protecting certain parts of the ship against the incendiary power of common shell. It was neither considered necessary to armor-plate the water-line throughout its entire length, nor to protect the lower parts of the ends of the vessel by strong armored under-water decks, and such protection therefore was not given.

As examples embodying these ideas we have the Warrior and Black Prince, each having a central citadel of armor  $4\frac{1}{2}$  inches thick, protecting a battery of about 213 feet in length. The total length of ship on the water-line is 380 feet, and the only protection afforded to the lower compartments in the hold at the ends of the vessel is given by a very thin water-tight platform, which can in no sense be considered an armored deck. Two other examples having about the same proportion of armored middle part to total length, are afforded by the Resistance and Defence, which in respect of armor distribution may be looked upon as small Warriors, just as Ajax and Agamemnon may be looked upon, so far as distribution of armor is concerned, as small Inflexibles.

The introduction of armor and the protection it afforded to the men and guns in the batteries, very naturally soon directed attention to the unarmored ends of the above vessels, and to the want of power possessed by these ships of maintaining their buoyancy and stability, in a way altogether foreign to the way of looking at the question when we were dealing with the old wood ships. In their case no question of buoyancy or stability was ever raised or even thought of, it was simply recognized that their destruction was a mere matter of time, and that their real safety lay in silencing their enemy's fire by their own guns, or capturing his ship by boarding, and not in any resistance the wooden sides might be capable of offering.

Attention having been drawn to this side of the question, the vessels next succeeding were made large enough to be armored on their water-lines through-

out their entire length. These comprised the Agincourt, Minotaur, and Northumberland, each of 400 feet in length, and of a displacement of about 10,700 tons. The Achilles, originally designed like the Warrior, was altered in the early stages of construction, and was provided with a water-line belt extending from stem to stern. The length of armor protection in these vessels is as under :

	Length of Water-line. Feet.	Length of Armored Battery. Feet.	Length of Belt. Feet.
Achilles.....	380	213	380
Agincourt.....	400	All but 24 feet at bow.	400
Minotaur.....	400	"	400
Northumberland.....	400	185	400

In two other vessels a contrary development took place, and in these, the Hector and Valiant, instead of having an unarmored battery of less length than the ship associated with a belt at the water-line extending throughout the entire length, we have an armored battery extending from stem to stern, and a water-line protection stopping about 30 feet short of each end.

During the above early development of the armor question, two other developments were going on which enabled constructors for some time to keep their water-line and battery armor up to and even slightly ahead of the power of the gun. These were, first, the reduction in the number of guns carried in the ship, which admitted a reduction in the size of the battery, and a corresponding thickening of the armor; and secondly, greatly improved methods of constructing the hull, which enabled weight to be taken from the hull and put into armor.

For these reasons it was possible to build all British ships, of the sizes considered suitable for the Navy, with water-lines completely armored from stem to stern, and the guns and gunners protected by vertical armor also, which was about equal to the power of the gun at moderate ranges.

These vessels comprised among others :

	Maximum Thick- ness of Water-line Armor. Inches.
Bellerophon, single-screw.....	6
Hercules, single-screw.....	9
Sultan, single-screw.....	9
Penelope, twin-screw.....	6
Audacious, class twin-screw.....	8
Swiftsure and Triumph, single-screw....	8
Alexandra, twin-screw.....	12
Monarch, single-screw.....	7

In these vessels an attempt was made to protect the rudder head, which was entirely exposed in the Warrior and contemporary vessels, by dipping the stern down into the water and covering the rudder head. Many of these ships, however, were single-screw vessels, and the protection could not be very good, as on that account the steering gear had of necessity to pass over the top of the blades of the screw.

In 1875 the Shannon was launched, having a belt extending right aft to protect the steering gear, the vessel being a single-screw vessel, but the belt stopped 60 feet short of the bow, and the lower part of the fore end of the vessel was protected by an under-water armored deck which ran right forward to thoroughly support the ram. The Nelson and Northampton immediately followed, but being twin-screw ships, the rudder and steering gear could be much better protected by an under-water deck than by side armor, and in these two vessels we have the first examples of the type of water-line protection adopted in the

Admiral class now building, viz. a central belt amidships and strong under-water decks at the ends.

[The difference is very great between the protection afforded to the steering gear by an under-water deck in a twin-screw vessel, and a belt with a single-screw. The steering gear in one case is well under a strong protective deck, which is itself a long distance under water. The whole of the gear is supported from the platform next below the protective deck, and has no attachment whatever to the protective deck itself, so that even if this deck were struck it could be driven down to a considerable extent without damaging any of the gear beneath it. Projectiles coming into the ship above the protective deck can do no harm to the steering gear at all.

In the other case the weakness of the thin belt, as compared with a deck some distance under water, is still further intensified by the necessity of carrying the tiller, &c., above the top of her single screw. The tiller is secured to the protective deck, immediately over it, and a blow on this deck might disable the steering gear. The steering gear can also be easily reached through the thin side armor. Projectiles striking in the same region in the central citadel ship cannot reach the steering gear.

In the case of a belted ship not being a single-screw ship the gear can, of course, be placed lower, but even then can be much more readily reached through the thin side armor or the above-water deck than through an under-water deck.]

As time went on the penetrating power of the gun continually increased, and although the absolute weight of armor at the disposal of the Naval Architect increased also, the armor rapidly became more and more inadequate for protection under the conditions of close range and a square hit, notwithstanding the thickening made possible by the reduction of its area; and now at the present moment there are guns afloat capable of sending projectiles not only through the thickest armor actually afloat, but through the thickest armor being arranged for in ships building.

It is possible, of course, to design ships armor-proof against all existing guns, and even to leave a margin against future gun development, provided we accept the consequent size of ship. It has, however, been decided everywhere by those persons controlling national expenditures and the sizes of ships, to build even the largest vessels with armor not proof under the above conditions of close range and squareness of hit to guns those ships may have to face.

The problem of the Naval Architect, then, instead of being the very easy one of making a ship proof against all guns actually existing or imagined as being in existence at a future time, and having no restriction placed on the size of his ship, has become the much more difficult one of arranging the imperfections necessarily imposed on his ship by limiting her size in such a manner as to allow no kind of imperfection to be so great as to admit of her speedy destruction by any possible mode of attack she is liable to be subjected to, and to produce as well balanced a set of defences against all the various risks his ship has to run as the size placed at his disposal will admit of. *He has to produce the best result on a given size and cost, and he wants to know what the best result is.*

If all persons were perfectly agreed as to the relative values of the various risks to be run by any one ship, we should have advanced a long way towards the best balancing of imperfections. The case, however, is not so easy. As we all well know, the relative importance of the various risks a ship has to run is estimated by each person in a way peculiar to himself, and the suitability of a given set of defences against those risks will also, of course, be judged by each person in the light of what he considers their relative values.

My duty to-day is to explain to you the modes in which the armor defences have been arranged in the principal types of ships, and not simply to express any opinion of my own as to the respective merits and demerits *as a whole* of any one plan. All the plans have good points, and all have bad points. Each

particular plan has its own special advantages, and for certain kinds of risk is superior to other plans. For different risks the advantage may change sides, and what was the superior defence may become the inferior defence.

After having explained the various special advantages and disadvantages attached to each plan, I must leave each one of you to draw his own conclusion as to the best plan for general all-round work, and in doing so you must bear in mind that the ship is of necessity imperfect in every single respect. No one feature gives us complete and perfect satisfaction. Every quality of the ship admits of enhancement, and we are not entirely satisfied with any one. A pillar to a roof supports the roof perfectly. We could not replace the pillar by one doing its work better. Every ship could be replaced by another having any one or more of its qualities enhanced, and for this reason we may truly say that a given ship is much too slow, that she does not turn rapidly enough, nor in a small enough space. She does not carry sufficient coal, her guns are too feeble and too few, and take too long to load, and notwithstanding this, she rolls and pitches so much that the few and feeble shots she is able to fire are nearly all wasted, due to this cause alone; and sometimes she cannot open fire at all on account of the heavy seas to which she is exposed. Her armor is too thin—much too thin, even where it is thickest, and is altogether absent from places where we should like to have at least a little. She is very vulnerable against the ram and torpedo, and her propellers are so much exposed to fouling as to render her incapable of steaming with impunity at a high rate of speed among the floating wreckage incidental to an action, and in spite of all her imperfect defensive powers, her means of saving life as a last resource, viz. her boats, are all so much exposed to machine-gun fire as to be quite useless after a well-contested fight.

I must insist on the above being duly appreciated before going on to describe the armor defences in our battle ships. In a floating body every increase of defence in one direction means either decrease of power in some other direction or else increase of size. I say increase of size, because largeness of size in a ship is looked upon as a defect in itself. The question of cost is, of course, important also, but only involves difficulties which are in our own hands. As soon as the taxpayer and his Naval Advisers agree that it is necessary to spend a large sum of money on a single ship, that money will be forthcoming and the ship built. No agreement between the taxpayer and his Naval Advisers enables a single ship of limited size to have more than a certain limit of defensive and offensive power. The size of a ship to fulfil certain requirements depends partly upon the properties of the materials we find in the market, properties over which we have only a very limited control, and partly upon what might be called the general level of engineering knowledge and professional skill existing at any given moment. At any given instant there are always certain things as impossible to obtain in combination as it is to obtain the moon, and the case of a single ship of limited size having all the qualities that various critics require is of this nature. All this must be clearly realized and willingly conceded before criticizing the armor defences in any one vessel, as we must bear in mind that the ship is sadly deficient in other respects—in respects in the opinion of many critics as important or more important than that of armor protection.

One man for instance says: I am willing to take my chance of being sunk just as the individual soldier is willing to take his chance of being shot; but you must give me great speed, plenty of guns, and guns as big as you can make them. I recognize fully that war involves serious risks, but I accept them all, provided you give me ample power of destroying my enemy. If my ship sinks, the other ships carry on my work just as in a land battle the survivors carry on the fight after the loss of their comrades. In my opinion it is as unwise to attempt to make ships invulnerable, or nearly so, as it is to attempt to make soldiers bullet-proof. You must depend upon numbers, and not upon individual invincibility.



Another says : In my opinion the torpedo is my deadliest foe, and, therefore, you must give me an armored inner bottom to protect me against torpedoes. I cannot get away from torpedo boats because they outrun me. I go 15 knots, they go 20. I cannot hope to sink them all by machine guns, or by my own torpedo boats even in daylight, and I cannot keep my torpedo nets down at a high speed. At night and in fogs I am still worse off, as I may not see the torpedo boats at all. You must therefore protect me against torpedoes by a proper construction of the hull, or else my ship, costing three-quarters of a million, may be destroyed by the enemy at a cost to him of only a few hundreds.

A third says : I must have a belt of armor at least all round my water-line to protect me against the gun. The gun is not like the torpedo or ram ; it cannot be avoided by any skill on my part. My buoyancy and stability must therefore be protected by armor against the gun. The gun must be defeated by resistance, as it cannot be by avoidance. The primary duty of the ship is to float and to keep afloat ; if she cannot do this she can do nothing, her power is gone. Everything must therefore give way and be subordinated to the necessity of perfect and complete protection to the water-line.

A fourth says : You must protect all my gunners, torpedo-men, and men serving the ammunition against heavy machine-gun fire. The big guns I am willing to risk ; they cannot fire very fast, and the practice is sure to be indifferent. My men, however, are only very few, the men who can shoot well are still fewer, and are necessarily among those most exposed. If casualties happen to them, I cannot efficiently replace them. The machine-gun bullets will come in a perfect hail, and only a few of them will be sufficient to kill all my men. You must therefore give me good protection against machine guns.

Such a critic does not always remember that machine guns are possible which would perforate the thickest armor of the Warrior.

A fifth person says : I am fairly satisfied with the offensive and defensive powers of my ship as a whole, but I want many more men under my command than you have given me. I am entirely powerless out of my ship. If I destroy batteries and forts I must still keep to my ship. I cannot land any men ; and if I beat my enemy at sea and capture his ship, I cannot take her as a prize into port, because I cannot put enough men on board her to prevent her again falling into the hands of the enemy and at the same time keep my own vessel efficient. I have no choice but to destroy what may be worth nearly a million of money. You must certainly give me many more men.

These examples might be carried much further, but we must let the above suffice.

Now, although all the above things are obtainable in a single ship, provided we make no restriction as regards size, it is a fact that there is no war ship at present in the world even nearly large enough to embrace them all.

If we wanted a belt of armor 24 inches thick amidships and 18 inches thick at the ends, a belt by no means completely gun-proof, four 150-ton guns, twelve 6-inch guns with a 3-inch side in front of them, a 4-inch inner bottom protection against torpedoes, ten feet in from outer bottom, and twenty knots speed, we should have a vessel of 20,000 to 25,000 tons displacement, and a cost for completed ship not much short of £2,000,000. The ship, large and costly as she is, is still imperfect ; her armor will roll out of the water and under the water. There is no protection against ground mines, and the belt, especially at the ends, is still vulnerable. The length of the vessel must be from 500 to 550 feet (*i. e.* nearly half as long again as the Warrior), the beam about 75 feet, the mean draught about 28 feet, and the indicated horse power about 30,000. Now, leaving out of consideration all question as regards cost, the size of this vessel, still imperfect, strikes one as being too great for a single officer to command. As regards size, she is already almost a fleet. If it were attempted to remedy the deficiencies indicated above, she would be still larger ; and she is already so long as to neutralize to a considerable extent the advantage of

her speed in ramming her enemy, as she cannot hope to turn so rapidly as a shorter ship.

I have been obliged to treat lightly of the ship as a whole, because otherwise it is quite impossible to intelligently devote consideration to any one feature. Our task is to view the armor defences of our ships under the above limitation of making a well-balanced set of offensive and defensive powers in a ship of limited size. It is very easy to say that the ship carries too little coal, has too little armor, and too little speed; that her guns are too small and too few. It is also easy to show that any given ship could be much strengthened as regards certain specified risks if one feature were developed and the others correspondingly diminished. On the other hand, it is very difficult to show that a given combination represents the best combination for general all-round work. This, however, is the task the designer of a ship has before him when his design is challenged, and in consequence of the variety of the risks to be run by his ship, and the various values put upon those risks by his critics, he can satisfy nobody. Each critic calls the ship defective, because he sees that the particular risk he attaches most importance to could be more safely run by diminishing the power of the ship to meet other risks he thinks more lightly of, and applying the saving in the direction he desires. The result of such criticism can only be that a given ship which perhaps best satisfies as a whole the criticism so freely bestowed upon her has nobody but her designer to defend her. All other persons see only the faults they desire to have removed.

Coming to the actual distribution of armor in the latest types of English battle ships, we may say that they are all central citadel ships, the turret ships having a comparatively high and short central citadel, and the barbette ships a shallower but longer belt. The armored length of water-line is given below:

Name of Ship.	Whether Barbette or Turret.	Length of Citadel.  Feet.	Length of Ship.  Feet.	Percentage of Area of Water- line covered by Armor.
Inflexible.....	Turret.	110	320	42
Ajax.....	"	104	280	45.4
Colossus.....	"	123	325	42.75
Camperdown class.....	Barbette.	150	330	56.35

The turret ships are compelled to carry their side armor high enough to protect the turning gear actuating the turrets, and as a consequence, a less length of water-line, and a correspondingly less percentage of its area can be protected by armor than is the case in the barbette ships. In the barbette ships the turning gear is in the barbette itself, and requires no armor on the side of the ship to protect it.

The arrangement of the armor in the turret central citadel ships is clearly shown in Figs. 1 to 14, which represent the Agamemnon. A central citadel of armor 104 feet in length reaches from 6 feet under water to the upper deck. This extends longitudinally throughout the length of the engine and boiler rooms, and encloses the two turrets. The maximum thickness of armor is 18 inches, and the top of the side armor is joined by an iron deck 3 inches thick. The ends of the citadel are formed of bulkheads, of nearly the same thickness as the side armor, as shown in Fig. 16. The midship section of the ship is shown in Fig. 1c, from which we see that the armor is worked "sandwich fashion," that having been considered the best method of working the iron armor in use at that time. The armor in the ships now building is faced with steel, and is made in one thickness.

At the ends of the vessel we have no side armor at all, but a 3-inch under-water deck running from the ends of the central citadel forward to the stem, and most thoroughly supporting the ram, and aft to the stern of the ship to protect the compartments below it. The steering gear and the compartments



below the protective deck are as completely protected against the big gun as we can well imagine. It is very difficult for a big gun projectile to get either through or below this deck on account of its being so far under water. Such projectiles striking the vessel near the water line simply go through the ship above the deck, and the inflow of water cannot extend below the deck. A big gun projectile striking a belted ship in the water-line region, where the belt is thin, would get through the thin side armor and be under the protective deck, which is on the top of the belt; there is nothing to prevent the projectile reaching the magazine in the belted ship and blowing up the vessel. This risk the under-water deck of the central citadel ships entirely obviates. Even if the magazine of the belted ship were not blown up, a very large and perhaps fatal quantity of water would find its way into the compartments below the protective deck, which in her is above water.

Returning to Agamemnon, all the magazines, shell rooms, &c., are under the protective deck, itself under water, and the ammunition is conveyed under cover of the protective deck till it gets within the limits of the central citadel, and is then taken up to the guns; the magazine arrangements are alike in the two ends of the vessel to ensure a prompt supply to the guns, and to enable the action to continue should one end be flooded. The top of the protective deck is covered by coals and other stores, which serve to exclude water when the thin ends are damaged. When the stores are consumed or partially so, and the thin ends riddled, the vessel does not sink so far beyond her load draught of water as when all the stores are in place, as the following table shows:

Name of Ship.	Sinkage from Load-draught with all Stores and Coals on Under-water Deck in place and Ends riddled.	Ditto, but with Half Coal and Stores in Ends, the other Half being consumed.	Ditto, but with all Coal and Stores in Ends consumed.
	Inches.	Inches.	Inches.
Inflexible.....	23	19	15
Agamemnon.....	22	20	18
Colossus.....	18	16	14
Collingwood.....	17½	15	13
Camperdown.....	14	12	10

At the sides of the vessel on the under-water deck there are two belts of cork clearly shown on Figs. 1*b* and 1*d*. These are separated by a "coffer dam," into which packing may be put for limiting the inflow of water when the sides are penetrated.

The stores in the ends on the protective deck are separated into several water-tight compartments, all of which must be destroyed before the sinkages given in the above table can be realized.

In the barbette Admiral type of ship we have an arrangement of armor differing from the above somewhat in detail, although the general plan is the same. The barbettes are placed much farther apart than the turrets are in the turret ship, and this necessitates an increased length of citadel to secure a protected communication between the barbettes and the magazines. The additional area protected by the longer belt allows the cork to be dispensed with.

In these vessels, see Figs. 2 to 2*d*, we have a central belt 150 feet in length and covering 56.35 per cent. of the total area of the water-line. This protects the engines and boilers. The belt is 18 inches thick, is of steel-faced armor, extends to five feet under water, and rises two feet six inches out of water. The top of the belt is joined by a 3-inch steel deck, and the ends of the side armor are joined by bulkheads nearly as thick as the sides of the belt. There is a strong under-water deck at each end as in the turret ship. This deck thoroughly supports the ram and protects the compartments beneath it. The deck is covered with stores in the manner described for the turret ship, and shown clearly at the ends of Fig. 2*b*.

The deck is subdivided by water-tight bulkheads, and spaces are appropriated for a "water chamber" at each end. This water chamber is an empty space into which water can be voluntarily admitted, and when partially filled it is found as a matter of practical experience at sea—one having been in use in the *Inflexible* in her recent commission—that the behavior of the vessel is much improved as regards rolling. (For further particulars respecting this water chamber, see page 793.)

The barbettes are connected to the top of the armored belt by a circular tube covered with thick armor. All the ammunition to the barbette guns goes through these tubes and remains completely under protection during its whole passage from the magazine to the gun. The loading gear in the barbette is well protected against the big gun, as it is all behind thick inclined steel-faced armor. The men in the barbettes are protected against the big gun by the thick side armor, and against the machine guns in the enemy's tops by a machine gun-proof plate covering the top of barbette. The barbette is protected from shell bursting immediately beneath it by a 3-inch floor shown in Fig. 2. There is a battery of six 6-inch guns and 6-pounder quick-firing guns under a light spar deck, and this is protected from raking fire by armored screens 6 inches thick, reaching from the barbette walls to the sides of the ship. The side in front of these guns is one inch thick. Along the top of the deck covering in the belt there is a coal bunker at the side of the ship as shown in the midship section at Figs. 2*b* and 2*c*. The section at the end of the ship is shown in Fig. 2*d*. All the hatches on top of the deck over the belt that are necessarily open when fighting the ship are protected by armored glacis plates and coffer dams, which rise to a height of more than five feet above water.

It is easy to see what the strong points of the above central citadel system are.

1. The guns and gunners are exceedingly well protected for the size of ship.
2. The ventilating tubes communicating with the boilers and engine rooms, and the tubes for bringing the ammunition through, are also equally well protected.
3. The engines and boilers are better protected against projectiles than if the same weight were carried along in the shape of a complete belt.
4. The magazines and shell-rooms in the ends of the vessel and the steering gear are much better protected by the under-water deck than if the sides were armored with armor not projectile proof, and the under-water deck removed from where it is underneath the coal and water to the top of a belt above water. The vitals of the ship—her machinery, her powder, or her rudder and steering gear—can only be reached, and the ship disabled by a single blow, provided that blow is much heavier than would suffice if the same weight of armor were more diffused in the shape of a complete belt.
5. For a length of about one-half of that of the entire length of the ship, viz. the unarmored ends, it is a matter of *non-vital* importance whether a big gun projectile strikes at the water line or not. In a belted ship such a projectile striking at this point might either blow up the ship or completely flood one end and render the magazine useless. The amount of water admitted would, in the belted ship under the above circumstances, be so great as to render her quite unmanageable and an easy prey to her enemy, even if it did not at once sink her outright. In the central citadel ship the amount of water admitted under these circumstances would be so moderate in amount as to leave the ship, as I shall show further on (see pp. 786-7), with her sea-going qualities and fighting qualities practically unimpaired.

An incidental advantage of the central citadel system is that the ram is very much better supported by a riveted deck than by side armor attached to the ship only by a comparatively small number of bolts.

It is also easy to see in what respects the above system is defective.

The ends of the vessel being formed only of thin plate, are readily penetrable not only by the lightest ship guns proper, but also by machine guns, and this penetrability renders a diminution of speed and stability both possible and probable.

If, however, we wished to carry the belt to the ends of the vessel and retain unimpaired all her existing qualities, we should want considerably more than 1000 tons additional displacement, and if we did carry the belt to the ends we should be less safe against certain risks than we now are. The steering gear would be more exposed, the magazines and shell rooms could be more easily reached, and it would be much more likely that the big gun would completely flood one or both ends of the ship, than when the strong deck was well under water. In attempting to obviate the risk of having a *moderate* quantity of water almost certainly admitted to the ends, we have largely increased the risk of having *fatal* quantities of water admitted, increased the probability of blowing the ship up, or rendering her unmanageable by disabling the steering gear, and have largely increased the size of ship. It is also certain that we have not obviated the particular risk we attempted to, for the belted ship is exposed to precisely the same defect of getting water in on her armor deck, notwithstanding that it is commonly spoken of as being above water, as the central citadel ship is of getting water in on her deck, that is under water. This defect is a defect common to both types of vessel, and not peculiar to the central citadel ship, as I now proceed to show.

If all the light projectiles reaching the two types of ship were to strike them only in the region marked by the belt in the belted ship, the belted ship would not suffer at all, and the central citadel ship would have a certain quantity of water admitted into her interior. For light projectiles striking the two types in any other parts there is nothing to choose between them, both are exactly on the same footing.

Fig. 2c represents the Camperdown constructed with a complete belt from stem to stern. The wave shown on it is that raised by Collingwood on her recent steam trials. Any projectiles striking the bow under the wave as shown, admits water to the vessel just as freely as in the under-water deck central citadel ship; if the projectile strike amidships just above the belt, the hole, in any seaway, is under water a great deal on account of the rolling of the vessel and the passage of waves along her sides. Large quantities of water may therefore find an entrance into the vessel, and it must be clearly realized that the alternation of the belt going under water and coming out of the water offers no impediment whatever to the accumulation of a fatal quantity of water. Unless the hole can be stopped or the inflow of water be prevented from obtaining a free access to the interior of the vessel upon the armored deck by water-tight subdivisions still remaining intact and undamaged, it is incontestable that the water must come in faster than it can go out, the water will accumulate and capsize the vessel—a defect which is said by some to be peculiar to the central citadel ship. The rate at which water enters and leaves the holes is determined by the difference of level between the external and internal water, and this may be considerable, and depends on the extent to which the vessel is rolling and the kind of waves that pass her. The rate at which the water leaves the hole depends upon its height above the hole. As soon as the hole gets fairly out of the water the internal water, under the assumed circumstances of having no available water-tight subdivision left, lurches over to the other side. It cannot escape through the hole above water, because it leaves it for the other side; it cannot escape through the hole it finds there, because the external water is higher than the internal water. The vessel, therefore, very soon capsizes.\* Any consideration, therefore, of the effect of water on the decks of a central citadel ship must be given with a full recognition of the fact that water is as injurious in the belted ship, and that the belted ship has only the same unarmored defence against fatal quantities of water being admitted as the central citadel ship has. The practical question for consideration is not, therefore, "Could we not escape all danger of this kind by making our ships a little larger, and giving them a

\* The lecturer here illustrated this fact by means of a model in a tank of water.

belt all along the water line?" but, "Is there sufficient speed, stability and buoyancy in the central citadel ship to ensure a reasonable probability of survival in action?" The answer to the first question we have just seen, as demonstrated by the model, is *no*; the answer to the second question I will endeavor to show you is *yes*. I am, of course, compelled to say a reasonable probability, because from the nature of the case, certainty of survival is unattainable. After everything has been done the ship will have to run some risk she can ill afford to run. Absolute safety she cannot have; she must be satisfied with less. That probability of survival could of course be increased by enhancing her present defensive powers, either by increased size or by diminution of some other quality in the ship.

Let us, then, consider the behavior of the central citadel ship a little more closely. To understand the principles regulating the sinkage of these ships when their unarmored ends are perforated and the whole of the internal watertight subdivision completely destroyed, let us consider a simple case.

It is a well-demonstrated truth that the weight of all floating bodies is equal to the weight of the fluid displaced by them. All bodies of the same weight must, therefore, have the same volume of displacement, no matter what their shapes may be, and if a body of given weight loses displacement in one place it must be made up in another. Corresponding to a given fixed weight we must have a given fixed volume of displacement.

The amount of water that comes in is quite independent of the nature of the stores and other articles, but only depends on the volume unoccupied by the stores themselves. So long as this volume remains unchanged the stores may be as heavy as lead, or as light as feathers, without making any difference to the amount of water that comes in. The loss of volume of displacement occasioned by the entry of water we may call  $v$ .

The vessel will sink in the water till the additional volume of displacement between the original and her new water line is equal to  $v$ . The necessary amount of sinkage to ensure this depends on the area of water line still capable of displacing water as the vessel sinks into it. This area is the area of the armored central belt + a certain fraction of the unarmored ends depending on the proportion of space in these ends occupied by solid water-excluding stores. If the space is half filled we must take half the area, if three-fourths we must take three-fourths, and so on. If, then,  $A$  be the area of the central belt,  $a$  the area of that portion of the unarmored ends still available for displacing water as the water sinks lower into it, the additional volume of displacement due to a given sinkage,  $s$ , must of necessity be  $= (A + a)s$ . The

sinkage due to the riddling of the unarmored ends is therefore  $= \frac{v}{A + a} =$  the volume of the interstices between the under-water deck and the original water line, divided by what we may call the effective area of the water line after allowing for the ends being damaged. The new water line is at a height  $s$  above the original water line.

The above principle has been applied to the following typical vessels, with the results stated against each. The sinkage of these same vessels due to coaling has been added for information and comparison:

	Sinkage due to Riddling the Unarmored Ends, estimated as above. Inches.	Sinking due to Coaling. Inches.
Warrior .....	32	16
Resistance .....	42	16
Inflexible .....	23	27
Agamemnon .....	22	20
Colossus .....	18	22
Collingwood .....	18	22
Camperdown .....	14	22



Beginning with the Inflexible in the above table, we see that the sinkage due to the riddling of the ends and the complete destruction of the numerous water-tight subdivisions is less than that she experiences every time she coals. In Agamemnon the sinkage is slightly greater, in the Colossus and Collingwood the sinkage is again less, and in Camperdown the sinkage due to coaling is 50 per cent. greater than that due to riddling. In Warrior and Resistance it will be noticed that the sinkage due to riddling is twice that due to coaling.

The table on this page gives much more detailed information on this subject.

If both ends of the ship be freely riddled and the whole of the subdivisional bulkheads on the under-water deck completely destroyed, the sinkage is less, and in some cases much less than that due to coaling. The amount of sinkage due to riddling is not great in itself, and unless it involves the loss of sea-going and fighting qualities in the ship, cannot in itself be objected to. This feature of the case I now proceed to deal with.

If only one end be riddled, the ship will change trim unless water be voluntarily admitted to the other end, and for which provision has been made. This change of trim can easily be calculated by the Naval Architect, or can be experimentally ascertained by means of a model. Both methods have been resorted to in the case of Inflexible with concurrent results. The change of trim is in no case sufficient to cause even much inconvenience on board and does not imperil the ship in the slightest degree. In Agamemnon the water line with the fore end only riddled is shown by *c.d.* in Fig. 1. It will be noticed that the fore end has not gone down much, and that the stern has not lifted to such an extent as to imperil the rudder or the propeller blades.

Name of Ship.	Area of Load-Water-line.	Percentage of Water-line Area covered by Armor.	Percentage of Water-line Area included in Coal Bunkers beyond Armor.	Percentage of Water-line Area included in Cork Chambers.	Remaining percentage.	Percentage of Cubic Contents of Spaces in previous Column occupied by Stores other than Coal and Cork.	Buoyancy lost by complete Riddling of unarmored Ends with Cork intact, and all Coal and Stores in Ends.	Sinkage of Ship corresponding to previous Column.	Buoyancy lost by complete Riddling of unarmored Ends with Cork intact, and one-half of Coals and Stores in Ends expended.	Sinkage of Ship corresponding to previous Column.	Buoyancy lost by complete Riddling of unarmored Ends with Cork intact, but all Coals and Stores in Ends expended.	Sinkage of Ship corresponding to previous Column.	Load-draught of Water of Ship from which Sinkages are reckoned.	Displacement at Load-draught.
	Sq. Ft.						Tons.	* Ins.	Tons.	* Ins.	Tons.	* Ins.	* Ft. Ins.	Tons.
Inflexible.....	19,000	42	30	11.4	16.6	25.4	750	23	760	19	770	15	25 3	11,880
Agamemnon....	14,850	45.4	18.5	12.85	23.25	24.5	580	22	580	20	580	18	23 6	8,510
Colossus.....	17,100	42.75	26.85	12.0	18.4	22.8	570	18	555	16	540	14	25 9	9,150
Collingwood....	17,100	54.15	17.4	None.	28.45	22.6	500	17½	500	15	500	13	25 9	9,150
Camperdown....	17,850	56.35	17.0	None.	26.65	21.0	420	14	425	12	430	10	26 9	10,000

Allowing the water to come in at one end only, she tips only slightly; allowing it to come at both, she sinks bodily, but leaves her armor still above water. We may therefore feel perfectly certain that so far as increase of immersion is concerned the central citadel ship is quite safe with either or both ends completely riddled.

\* All these sinkages are reckoned from the load-draught given in the last column but one.

The same two courses may be followed with respect to her stability. The Naval Architect may either calculate the stability of his vessel in any assumed condition of damage, or he may ascertain the same thing experimentally by the aid of an accurate model. Both these methods have been resorted to in the case of Inflexible with perfectly harmonious results.

The stability of a vessel is usually represented by what is called "a curve of stability," the construction of which will be readily understood from Fig. 3. When inclined over at a given angle of inclination, the weight of the vessel acts vertically downwards through G the centre of gravity of the ship, and the support of the water acts along the line marked "line of buoyancy." These two lines have a perpendicular distance, GZ, between them, the length of which is an exact measure of the amount of stability the vessel has in the condition assumed. When GZ is great the stability is great also, and when small the stability is small. The weight of the vessel always acts through G, the centre of gravity of the vessel, at all angles of inclination. The determination of the amount of stability a vessel has in a given condition and at a given angle of inclination depends simply upon an arithmetical calculation of the position of the line marked "line of buoyancy." The length of GZ is calculated for various angles, and the results set off graphically as shown in the shape of a curve, which is appropriately called a curve of stability.

The curves of stability of Inflexible for various conditions of ship are given in Fig. 4. The soundness of the principles on which these curves were calculated was examined by the members of the Inflexible Committee, consisting of Admiral Sir J. Hope, President, Dr. Woolley, G. W. Rendel, Esq., W. Froude, Esq.

This committee considered the soundness of these principles unassailable, and further considered that the amount of stability the vessel had was sufficient. In their report they said "*e* or *f* might fairly be assumed to represent the greatest amount of damage the ship would be likely to suffer in action. This represents the unprotected ends completely riddled and waterlogged, but the materials and cork remaining and adding buoyancy. In *e* the whole of the coal is assumed in place, in *f* it is assumed to be removed. If reduced to this condition the ship would possess both buoyancy and stability enough to face all contingencies of weather. The united movement of all her guns from the loading to the firing position would not heel her more than  $2\frac{1}{4}^{\circ}$ . . . . It cannot be said that the armored citadel is invulnerable, or that the unarmored ends are indestructible, although the character of the risks they run is different. But, in our opinion, the unprotected ends are as well able as the armored citadel to bear the part assigned to them in encountering the risks of naval warfare, and therefore we think that a just balance has been maintained in the design, so that out of a given set of conditions a good result has been obtained."<sup>†</sup>

This Report was signed December 4th, 1877.

A previous committee, presided over by Lord Dufferin, reported in 1871 that the "only method of bringing about a well-considered armor-plated ship was to have a central belt and raft ends with an under-water deck." Two naval members of the committee, Admiral Ryder and Admiral Elliot, went much further in this direction, and advocated the entire abolition of side armor for the protection of buoyancy and stability, and to employ armor-plating only for the protection of guns and gunners. The water-line was to be protected by a cellular structure only. The members of this committee were: Lord Dufferin, President; Sir W. Thomson, Admiral Elliot, Admiral Ryder (these two members recommended the entire abandonment of side armor from stem to stern in all classes of ships); Admiral Hornby, Admiral Stewart, Dr. Woolley, Professor Rankine, W. Froude, Esq., Captain Hood, Captain Goodenough, G. W. Rendel, Esq., Peter Denny, Esq., C. P. Bidder, Esq., T. Lloyd, Esq.

\* The *Monarch*, when her coal is consumed, heels nearly  $5^{\circ}$ , due to this cause, when she is intact and undamaged.

† The question of speed is dealt with on page 794.

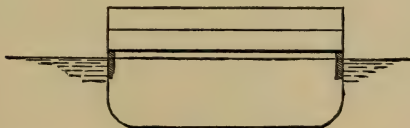


We therefore have it on record that the above committee deliberately formed the opinion that the central citadel ship, with under-water decks at the ends, was the best ship that could be devised for encountering the varied risks of naval warfare. This opinion was arrived at after hearing all that could be said on the subject by any person who had anything to say. The above two committees had seven naval members, all of flag rank, except two. Two flag officers dissented from the above only to the extent of giving up even the central armored belt amidships. So far from objecting to the unarmored ends, they were willing that the water line should have no armor at all.

I do not, however, wish you to be guided in this important matter merely by the weight of authority, however great that authority may be. You may say, too, that the conditions have changed since the above reports. Let us assume, then, that on account of the development of the machine gun, the quick-firing 6-pounder, and the introduction of the smaller breech-loading guns, that we must have adequate protection against these weapons. Such protection, of course, is much to be desired, if we can afford it. Other increases of defence are also desirable. It is not so easy to give protection against the above guns as some suppose. It is quite certain that the addition of a complete belt along the whole length of water line does not give us this protection.

If an enemy can destroy the unarmored upper works of a ship, as some say is almost certain to be the case, the only conclusion we can come to is, that the belted ship, although less safe in other respects than the central citadel ship, is no safer in this one respect of being capsizable by light guns only.

*Fig. 5.*



Let us take a completely belted ship, such as that in Fig. 5. It is easy to see at once, that apart from her unarmored upper works, she is a low freeboard vessel and has no useful range of stability.

All foreign vessels of this type, like their English rivals, depend for their stability in a well-contested action on the improbability of their unarmored upper works being completely destroyed. If their unarmored upper works are opened up freely to the sea they will capsize quite easily, in spite of their belt, as I have previously shown. The floating models before you show very clearly that these vessels depend for their stability on their unarmored upper works.\*

\*The two models were floated in a tank. The whole of the upper works of the belted ship were supposed to be freely open to the sea, having been completely perforated by light guns. The ship was shown to be certain to capsize in any seaway, or even by steaming ahead in smooth water. The central citadel ship was shown in a condition with all the water-tight subdivisions before and abaft the belt completely destroyed from the under-water armored deck upwards. The side in front of the 6-inch breech-loading guns was also supposed destroyed, and of no use for the exclusion of water. The side in front of the belt of coal was also supposed destroyed, but the inner bulkhead remaining intact. In this condition, involving the complete destruction of all the unarmored upper works of the vessel right through from stem to stern, and from the armor belt and armor decks upwards, with the single exception of that portion of the ship comprised between the inner coal bunker bulkhead on one side to the similar bulkhead in the other, the model could not be capsized by any sea that could be raised or even by pushing her ahead very violently. If the destruction done to this ship had been completed, as was done in the belted ship, she also would have easily capsized under the same treatment.

These experiments show that both types can be sunk by simply destroying their unarmored upper works, and show further that the central citadel ship with an amount of destruction done to her unarmored upper works only just stopping short of absolute completeness will be quite safe in a seaway, and can be steamed ahead without capsizing.

I do not want to leave an impression on your minds, from having witnessed these experiments, that the belted ship is less safe against the machine-gun and small-gun risk, than the central citadel ship is, or that you would easily capsize the belted ship if she were your enemy in an action by accomplishing the complete destruction of her upper works, as supposed in the model. I am only showing that it is altogether wrong to suppose, as some do, that the possession of a completely armored water line takes away all anxiety as regards light-gun fire. It is perfectly true that the Admiral type of ship is destructible by light guns if they have time enough. It is perfectly true, also, that the belted ship is destructible by the same weapons, and has more chance of being destroyed by the big gun. So much for the complete destruction of the upper works in both types of ship.

When the damage stops short of completeness it is purely arbitrary to say we should provide that a certain amount of stability should be left when specified parts are penetrated. All assumptions that may be made as to the probable damage a ship may experience are open to objection. All such assumptions are mere guess-work, and probably no two persons would agree in making them. The best method is to look at the matter generally, and not in any specified precise way. Adopting this plan, we may say that in our English Admiral type a very large proportion of the unarmored upper works must be destroyed to reduce the range of stability to  $30^{\circ}$ , and even when this has been done the vessels will, in the words of the Inflexible Committee, be able to face all contingencies of weather.

The stability of our battle ships depending so much on their unarmored parts, it is important to make these unarmored parts as efficient as possible for the purpose. In the English battle ship this unarmored defence has been made as great as possible by the suitable disposition of water-excluding stores,—the coal, cables, provisions, and in some cases of cork,—most of which are well protected by being under water.

I do not know the exact nature of the unarmored defences in the belted ships of the world, but the model experiments you have seen show that it is quite certain that they are as much needed in their case as in the case of the central citadel ship.

## LECTURE II.

We have seen for ourselves how the stability of the central citadel ship and of the belted ship stands in smooth water, and we have also seen what the Inflexible Committee thought of the sufficiency of the stability of that ship to provide safety against stress of weather and sea. Let us now look a little into the matter ourselves and ascertain the grounds of safety at sea.

It must be a perfectly well-known thing to everybody here that if we take a pendulum or a man in a swing and carefully time our impulses we shall certainly get the pendulum over its point of suspension, no matter how feeble our impulses may be, always provided they are kept up long enough and that there is no resistance. If the resistance is very great, due to the pivot being jammed or to the pendulum having to vibrate in a fluid, it may not be possible to capsize the pendulum even with the most sustained and most carefully timed impulses. The resistance might be too great for the applied force to overcome even if it could be kept up without flagging. If the applied force were too small in relation to the stability or resistance or could not be kept up long enough, the pendulum might be perfectly safe against capsizing.

In the case of a ship 1500 miles from port we cannot depend upon the capsizing forces not being kept up long enough, the sea is untiring, and therefore our only safety lies in having a sufficient amount of stability and resistance to rolling. The stability and resistance to rolling are in our own hands, and we may make them, within certain limits, what we please. The motion of the sea is beyond our control; this we have to contend with as best we may.

I must ask you to bear in mind what is so frequently lost sight of, viz. that both resistance to rolling and stability are necessary to safeguard a ship against capsizing at sea. No amount of stability, apart from resistance, could give a well-founded assurance of safety, and no amount of resistance to rolling apart from stability is sufficient to safeguard the ship. We must have a combination of both.

The stability of a vessel, apart from resistance to rolling, is a thing that effectually safeguards the ship from capsizing only in still water under steady inclining forces, such as having a deck load on one side of the vessel or a wing compartment filled with coal or water. In a seaway the stability depends for its value on the extent to which it is associated with resistance to rolling. The more and more the resistance to rolling is increased, the more and more does a given amount of stability assure the safety of the vessel. The more the resistance increases, the less is the needful amount of stability to ensure safety against capsizing by the heave of the sea. With an increased resistance to rolling a small amount of stability may leave just as large a margin of safety as a larger amount of stability and a decreased amount of resistance. With no resistance to rolling all vessels would be unsafe under circumstances to which they might at any time be exposed.

Coming back to our pendulum; we could baffle the efforts of a man to capsize it, either by loading it more heavily and increasing its stability, or by leaving its stability alone, or even decreasing it, provided we jam the pivots harder, and increase its resistance to oscillation.

Now the increase of resistance to rolling is precisely that which happens when we perforate the ends of the central citadel vessel and reduce her stability. As the ship rolls, the water in her ends dashes about from side to side, and increases her resistance to rolling to such an extent that under these circumstances the vessel will roll much less than when intact and undamaged, and be in no more danger of capsizing than before her ends were wounded.

This power of the water to reduce rolling has, I know, been looked upon with a very scanty amount of belief by many persons, as being contrary to a practical seaman's judgment, but here is an experiment to show you that the statement is beyond question.

[At this point of the lecture models were used representing the midship sections of the Admiral class, and were both of the same weight and size. Each model was mounted on trunnions, at about the level of the water line, and both oscillated freely on these trunnions in exactly the same time. The models were placed one behind the other, so that the parallelism of the masts was evident to the audience. One model was provided with a glass tube into which varying quantities of water could be put. An amount of water representing  $\frac{1}{100}$ th of the total weight of the model, *i. e.* 100 tons in a 10,000-ton ship, was now placed in the tube, the models were started from the same angle as before, and the model with the loose water, instead of keeping up exactly with the other, or rolling more violently, came almost instantaneously to rest.]

Notwithstanding the result of the above experiment, there may be some persons in the room who are still dissatisfied as to the power of the water to moderate the rolling of a ship at sea. Such persons may say I cannot disprove the accuracy of your experiment, but I am satisfied there is some error in your inference, because your inference does not accord with my practical experience at sea. My experience at sea teaches me that if one of my guns, for instance, takes charge, the ship at once rolls more violently in consequence, and if there is any truth in your theory, the reverse ought to take place; the ship ought to be steadied by the motion of the gun.

I have no hesitation at all in saying that the motion of the ship is steadied by the motion of the gun, and here is an experiment to prove it.

[One of the models described above was provided with a grooved traverse

in which a marble could freely run from side to side, the marble being stopped at each end of its roll by the sides. The weight of the marble was on the scale of 100 tons for a 10,000-ton ship. The tube in the second model was emptied of water; the marble put in the first model, and the two started from the same angle as before. The model with the marble freely traversing the deck came almost at once to rest.]

As regards the shot or gun at sea, its effect is baneful as regards the ship's structure and men's legs, but beneficial as regards the violence of rolling.

There may also be some persons in the room who will say, I admit all that you say you have done, but that does not cover my point. You have taken 100 tons of water or 100 tons of gun and shown that that quantity effectually moderates the rolling. I have never doubted that it would. You may, however, have 600 tons of water on deck, and if you do, what will happen then? I may take one grain of arsenic with perfect safety or even with advantage, but what will happen if I take six? As regards the arsenic I am not competent to answer that question; but I can tell you what will happen if you increase the amount of water. The action of the water in moderating the rolling depends entirely on the possibility of its moving; if the space is full and the water in consequence cannot move, you get no more effect than if the water were so many tons of pig ballast, and here is an experiment to prove it.

[The tube in the model was here filled with varying quantities of water, and the effect was always to stop the model much sooner than the model with no weights free to move. The two models were always started from the same angle, so that their relative behavior could be easily seen. When the tube was quite full there was practically no effect. The two models rolled almost together.]

In the actual ship we may have a small quantity of water with plenty of space to move about in, or a larger quantity with less space to move about in. As the empty space gets more and more filled with water the space available for the motion of the water becomes less and less, and ultimately with the ends quite filled with water only a small portion of the upper part of the water can be considered as free to move. The lower part is locked on account of filling the space it occupies.

We must now be quite satisfied that as regards the particular models before us, there is a very rapid reduction in the arc of oscillation due to the transverse motion either of free water or a moving solid weight. I want you to infer from what you have seen, that the same reduction must always occur in a rolling ship if we have a loose weight of any kind, whether the weight be water or a gun. If this reduction did not take place, we should have something to explain which would be quite inexplicable. For suppose we have two ships alike in all respects as regards size, shape, weight, time of oscillation, &c., and situated on precisely the same seas, but one having all her weights properly secured, and the other with a weight capable of traversing the deck every time the ship rolls. If the two vessels were to roll to exactly the same extent we should have the sea not only rolling the ship with the loose weight to the same extent as the ship with all her weights fixed, but the sea would, in addition, be doing all the work involved in the transversing of the heavy weight across the deck, which is quite impossible under the circumstances of perfect similarity we have supposed. The sea can only do the same work on both. In the one case that work consists entirely in rolling the vessel, in the other it consists partly of rolling the ship and partly in dashing the weight about. The rolling in the latter must therefore inevitably be less than in the former case.

Let us apply the same reasoning to our two models. If they were placed *in vacuo*, and mounted on frictionless pivots, the one without the moving weight would go on swinging forever. If the other with the moving weight went on swinging forever also, we should have a perpetual source of energy in the blows caused by the transversing of the weight,—a source which we all know is an impossibility. We should have all the work of hammering which we could apply to do any work we please. Stated in this way the reduction of roll follows as a necessity. The truth is that every time the blow occurs the marble



or the water is made a little hotter than it was before, precisely in the same way that the stoppage of a bullet against a target generates enough heat to partially or entirely melt the bullet. All the additional energy in the water or marble due to its increased temperature has had to come from the energy stored up in the oscillating model, and coming from this source has, of course, reduced the extent of oscillation in the manner you have witnessed.

Considerations of the above sort led to the conclusion that although with the ends waterlogged, the ship would of necessity have less stability than when intact, yet the resistance to the rolling would be so much increased as to make that stability, degree for degree, much more valuable than when intact, and also make the ship much steadier and consequently render her big guns more formidable.

The power of loose water to reduce the rolling motions of ships having been ascertained experimentally, has been applied on a large scale in the *Inflexible*. In this ship a water-chamber has been in successful operation on actual service at sea, and the behavior of the ship, although very good without the water-chamber in operation, was considerably improved when water was admitted to it. In all the recent designs of English battle ships a space for a water-chamber has been appropriated. The Admiral class of vessels has less metacentric height than the *Inflexible* has, and has the same advantage as the *Inflexible* as regards water-chamber. It is quite certain, therefore, that the excellence of behavior we have had reported from the *Inflexible* will be more than realized in the Admirals. It is important to bear this in mind, because one class of critic says the central citadel ship may be made perfectly safe against capsizing when the ends are riddled, provided you make your stability when intact so great as to admit of the necessary reduction of stability you incur when your ends are damaged. The stability necessary for this purpose will, however, certainly make your vessel roll much more than you need to make her roll, whereas in the belted system you need only provide as much stability as is necessary for the intact condition. This criticism, however, can have no weight in the face of the favorable reports received as to the behavior of *Inflexible*, the ship which we are quite certain will roll under ordinary circumstances more than any of the Admirals.

A series of very careful experiments has also been made at Spithead in smooth water on board the *Edinburgh*, to ascertain the effect of varying quantities of water in adding to the ship's rolling resistance, and also for ascertaining the best quantity of water to put in the water-chamber. It was found that 100 tons was the best quantity to be used in the water-chamber provided. The best quantity of course varies with the size of water-chamber and other features, such as size of ship, time of swing of ship, &c., and can only be found experimentally in each individual case. It was found that when rolling to  $10^{\circ}$  the rolling resistance was increased by 43 per cent.

Two feet addition to the bilge keels would add 67 per cent. to the rolling resistance at all angles of roll. The water-chamber is more effective at small angles of rolling than the bilge keel, and is consequently much more efficacious in bringing the ship to a dead stop than the bilge keel, whose power of stopping the ship gets less and less as the angle lessens. The relative effects of the water-chamber and two feet of additional bilge keel are compared below :

The water-chamber at	$3^{\circ}$	adds 6 times	} as much as 2 feet additional bilge keel.
" " " "	$5^{\circ}$	" 3 "	
" " " "	$12^{\circ}$	" the same	
" " " "	$18^{\circ}$	" one half	

For violent rolling at sea the bilge keel is the more efficient of the two, but for moderate angles of roll in good fighting weather the water-chamber is the more efficient of the two in steadying the guns.

As illustrating still further the effect of moving water in steadying the ship, let us consider the following table prepared by the Inflexible Committee :

	Range of Roll. Degrees.	Range of next Roll. Degrees.	Loss of Range. Degrees.
Sultan.....	10	9.6	0.4
Inconstant.....	10	9.2	0.8
Devastation.....	10	8.0	2.0
Inflexible, intact.....	10	9.0	1.0
“ riddled and gutted*.....	10	2.6	7.4
“ in condition <i>f</i> †.....	10	2.2	7.8

In the four first examples in the above table we have no moving water and a small reduction of range of roll. In these four examples the figures are obtained from the actual ships. In the two last examples the figures have not been obtained from the actual ship, the ship never having been in the condition supposed. These results were obtained from a model‡ of the vessel, most carefully constructed as to distribution of weight, &c., so as to accurately represent the ship. It was also estimated by the Inflexible Committee on principles that were thoroughly tested by actual trials at sea, Mr. Froude having previously gone to sea on purpose, that if the Inflexible were exposed to a series of waves as large as any on record, viz. about one-fourth of a mile in length and 40 feet in height, her maximum angle of rolling would be as under :

Condition of Ship.	Maximum Angle of Ship's Deck with the Horizon. Degrees.	Maximum Angle of Ship's Deck with Wave Surface. Degrees.
Riddled and gutted.....	2	7½
In condition <i>f</i> .....	6½	10

The angle of vanishing stability in these two conditions is over 30°, and the committee reported in consequence that the ship “would possess both buoyancy and stability enough to enable her to face all contingencies of weather.” As regards buoyancy and stability, then, we may rest assured that the central citadel ship when well designed is perfectly safe, even when her unarmored ends are freely riddled.

I now proceed to deal with the question of speed. The Inflexible Committee reported that in the above extreme conditions of damage the speed may be seriously impaired, but in all other respects the vessel would be able to exercise all her powers. . . . The heel due to her circling at the highest speed attainable would not be an element of danger.

Some persons suppose that the above feature of reduction of speed under extreme conditions of damage is in itself a fatal objection to the adoption of central citadel ships. If this feature were peculiar to central citadel ships it would of course be a very serious objection to them. This defect is, however, by no means peculiar to the central citadel type ; it exists also in the belted ship, and to an equally fatal extent, as I shall show. If I were to tell you that when the three main compartments in the hold of a belted ship were bilged the vessel would go down, and that, therefore, the belted type was a bad type, you would say it may be useful to know that the ship would go down under these circumstances, but so would any other ship, and therefore that fact in itself says nothing as regards the badness of type. Your very natural answer is the one I am compelled to adopt. I am very sorry the central citadel ship is liable to the above reduction in speed. I am equally sorry the belted ship is

\* “Riddled and gutted” means that the ends are freely penetrated, and the whole of the stores and cork blown out of the ship.

† For condition *f*, see page 788.

‡ This “model” weighed nearly a ton, which is greater than the weight of many ship's boats.



also liable to the same reduction. The belted ship is liable, in addition, to other defects not existing in the central citadel ship, as I now proceed to show.

If we take the case of the two ships *at rest in smooth water* and open a smart fire on them of heavy machine guns and of 6-pr. guns, we should admit, if we *completely* destroyed the internal subdivision over the under-water deck, 600 tons of water into the central citadel ship, and the ship (Camperdown) would sink fourteen inches in consequence.\* If the destruction of the internal subdivision were less complete, less water would be admitted, and the sinkage would be less than fourteen inches. All the damage to the belted ship would be above the top of her belt, which is  $2\frac{1}{2}$  feet above water. In this vessel, therefore, there would be no entry of water (under the circumstances supposed of being motionless in smooth water) and no sinkage. Both ships are certain not to capsize. The central citadel ship has sunk fourteen inches, the belted has not gone down an inch.

If, now, we were to steam ahead with both ships, and suppose no more water admitted to the citadel ship and none to the other, the central citadel 10,000-ton Camperdown would lose one-fourth of a knot due to the fourteen inches increase of immersion, and the belted ship would lose nothing. The central citadel ship was able to start with an additional knot over the belted ship on account of being able to put more weight into machinery due to savings from the belt. All the time, therefore, no further water comes in, she is three-fourths of a knot better off than her belted antagonist, notwithstanding she has lost a quarter of a knot and the belted ship has lost nothing.

It is not reasonable, however, to suppose that no more water (under the above circumstances) will come into the central citadel ship; some of the holes will be scoop-shaped and tend to draw water into the ship, and the holes may also be very numerous. It must be admitted that more water *may* come in. It must also be recognized that the complete destruction implied by the admission of the 600 tons referred to above can only be a slow process, during which the belted ship cannot hope to remain undamaged, and whatever may be the amount of water contended as being certain to come into the central citadel ship over and above the preceding 600 tons must also come into the belted ship, because all the time she is steaming at a fighting speed her belt is not  $2\frac{1}{2}$  feet above water as it is in harbor, but is more than covered at the stern by the stern wave, and is from six to ten feet under the water at the bow, see Fig. 22. The midship part is also half its time under water on account of the roll of the ship and the passage of waves along her sides, and the tendency of this is, as we have seen on page 9, to accumulate water. The truth is, that so far as the accumulation of water goes, the top of armor is in both cases under water; in the belted ship it is 6 to 10 feet under water at the bow, and in the central citadel ship it is about 4 feet more. It is just as easy to get water into the belted ship when she is steaming ahead at a fighting speed in a seaway or even in smooth water as it is in the central citadel ship, and both must deal with the incoming water in the same way, *i. e.* allow it to run overboard again through suitable relief scuttles as fast as it comes in, or deal with it if possible by the pumps. It is important, too, to bear in mind that during all this time the central ship is steadier than the belted ship, making her big guns more formidable, and as her rolling is reduced by the loose water in her ends, water cannot find its way in above the belt amidships so rapidly as in the ship belted during the whole length of her water-line.

If it be contended that the central citadel ship may have all her unarmored structure destroyed, and that she will then be unable to steam ahead without danger of capsizing, I say you must allow that the belted ship may have all her unarmored structure destroyed, and here is an experiment to show you

\*In this statement it is supposed that all the stores are on the under-water deck. In this case the armored central belt is still sixteen inches out of water, with ends completely damaged. If the stores on armored deck were previously consumed and the vessel riddled, the central belt would have its top twenty inches above water.

that she also cannot steam ahead without certainty of capsizing.\* The only inference one can draw from seriously reflecting on the case is either that you must give up contending that these extreme conditions will certainly be realized, or else come to the conclusion that naval warfare is impracticable on account of the certainty of destruction of all those engaged in it. There is no choice in this respect between the belt and the central citadel; both alike will be certain to capsize.

The case, however, is not really as bad as the above. In both types of vessel we have to bear in mind that the holes made are what we might call chance holes. Some are made in one way and some in another. Some, on account of their shape and position, induce a rapid inflow of water, and some, owing to their shape and position, induce an equally rapid outflow. The aggregate tendency of the holes to run water into the ship may not, therefore, be very much, but whatever it is, it is the same in both types of vessel and must be dealt with in the same way, viz. the water must be allowed to run out again through holes provided for that purpose in the design of the vessel and opened when occasion requires. It is perfectly true that the limitation of speed pointed out by the Inflexible Committee exists in the central citadel type of ship, and must be borne in mind by her commanding officer. It is equally true that the same defect exists in the belted ship and must be borne in mind by her commanding officer.

Having considered the various points of difference between the central citadel ship and the belted ship item by item, I submit that I have established the following:

1. That all modern battle ships depend for their stability to a large extent on their unarmored parts. Their probability of survival in action, so far as stability goes, depends almost entirely on the improbability of the whole or the greater portion of the unarmored superstructure being completely opened to the sea. The possession of a complete belt along the water line cannot keep a vessel from capsizing if the unarmored superstructure is entirely opened to the sea. A belted ship is no safer in this respect, and is less safe in other respects.

2. In the under-water deck system some portion of the superstructure above armor is under water, and is not so easily destroyed as the above-water portions in the belted system.

3. Although in the under-water deck system it is practically certain that moderate quantities of water will be admitted to the ends of the vessel, it is quite certain that the admission of only moderate quantities will not prejudice the stability of the vessel to an important extent, and will so steady the vessel as to enable her to make good practice with her big guns. On the other hand, it is much more likely that very large or fatal quantities of water will be admitted to the ends of the belted vessel, and it is also much more likely that the powder and steering gear will be reached in the belted ship by the big gun than in the central citadel ship, because the thin vertical armor on the belt at the ends and the above-water deck over its top are more penetrable to the big gun than the under-water deck of the central citadel ship, well covered as it is by the sea and stores on its top.

4. As regards the loss of speed occasioned by the admission of water, what might be called the smooth-water sinkage of the central citadel ship causes a loss of only one-fourth of a knot in speed, out of an additional knot it was possible to arrange for in the design to start with.

5. As regards the loss of speed due to any supposed rushing in of the water through scoop-shaped holes, it is not a difficult thing to let the water out again by holes suitably shaped and properly positioned; and even if it were, this is

\*The model of the belted ship previously referred to was allowed to float with a number of shot holes in her upper works, during all the previous part of the lecture, and at this stage was pushed ahead in the tank. The water accumulated in her to such an extent as to capsize her.

a defect which is as great in the belted ship as in the under-water deck ship, because all the time the vessel is steaming at a fighting speed, each end of the belt is permanently under water on account of the waves raised by her progress (see Fig. 22), and the midship part of the belt is half its time under water on account of the rolling of the ship, and the passage of sea waves along her side.

6. That the central citadel system with under-water decks at the ends protects the magazines in the ends of the ship, the steering gear, and supports the ram much better than the belted system does, and at the same time provides, on a given weight of armor, a very much thicker belt amidships than the belted system does, and as a consequence gives greater protection to the engines and boilers also.

7. That with the central citadel and under-water decks, the admission of water to one end alters the trim so little as to leave it a matter of option and not of necessity with the commanding officer whether he will voluntarily admit water to the other end or not. If water be voluntarily admitted to the ends before going into action there can be no further derangement of trim, the vessel will be quite safe, will be almost perfectly steady, and will have lost only one-fourth of a knot in speed out of an additional knot provided for in the original design. See page 798.

In the preceding part of my lectures I have laid great stress on the limitation placed on the Naval Architect as regards the size of his ship, and showed that it was not possible to have a belt the whole length of the water line on the size adopted, and at the same time to have all the other qualities asked for.

It can hardly be necessary for me to point out that there are two sides to the question of increasing the sizes of ships. The problem of the Naval Administrator must always reduce itself ultimately to that of obtaining the maximum of offensive and defensive power on a given sum of money. The amount of money may be large or small, but he, like everybody else, has to obtain the maximum value for it. Some people contend for having large ships of great powers, and fewer of them; others contend for greater numbers and less individual powers. It would be presumptuous for me to say anything on this point; but I presume you expect me to say something as to the policy of having a belted water line if the present sizes of ships were considerably increased. I therefore go a step further and say that even with the larger ship and greater amount of armor possible for her to carry, it follows from the above summary that, as the belted water line gives so little advantage as regards some kinds of risk, none at all against others, and involves greater risks in several vital respects than the central citadel system does; it would be much better to employ the additional weight of armor in thickening the decks, the central belt amidships, and particularly in increasing the height of the central citadel armor, than to employ it in making a belt along the whole length of water line. A short high belt amidships, where the vessel is broad, costs no more per foot of the ship's length than where the vessel is narrow, but has a much greater value in maintaining the buoyancy and stability than the same armored area, extending the whole length of the water line and reaching only  $2\frac{1}{2}$  feet above it.

The question of having 2-inch or 3-inch armor on certain parts as a protection against quick-firing guns does not properly come within the scope of the above comparison between the two types. For machine-gun risk both types would be better with such protection, but on a given size of ship would be more vulnerable to the big gun. The development of the machine gun has stopped at its present stage simply on account of the acceptance of thin sides. If a serious attempt were made to defeat the machine gun by thickening the sides of our vessels, the same fight between the machine gun and the armor opposed to it would certainly be gone through, as we have seen in the past evolved from the 68-pounder mounted on truck carriages, and the 4½-inch iron armor of Warrior. The result of such a fight you are all in as good a position to imagine as I am.

I have endeavored in the above to bring clearly before you the differences between the two systems of protection. We will now consider in another way the effect of having a complete belt as compared with a central citadel. The table below gives the percentages of the total ship appropriated to each particular item. It will be seen that the completely protected water line leads to a considerable increase of size, a diminished speed, a diminished weight of armament and of coals. The big guns are also protected to a much less extent than in the central citadel ship, and we have fewer ships in proportion to the total outlay.

	Typical Ship with Short Belt.	Typical Ships with Belts from End to End.	
		No. 1.	No. 2.
	Percentages.	Percentages.	Percentages.
General equipment....	3.5	4.5	2.0
Armament.....	8.5	6.5	6.5
Machinery.....	13.5	11.0	10.5
Coals.....	9.0	6.0	7.0
Armor and backing....	30.0	36.5	38.5
Hull.....	35.5	35.5	35.5
Total.....	100.0	100.0	100.0
Displacement in tons,	10,000	10,900	11,200
Speed in knots.....	16	15	15
Max. thickness of armor.....	18 ins.	21½ ins.	21½ ins.
Protection of powder passages to barbettes.....	12 ins.	4 ins.	12½ ins.
Barbette armor.....	14 ins. sloping.	15¾ ins. vertical.	16½ ins. vertical.
Principal armament...	4 63-ton guns.	4 48-ton guns.	3 75-ton guns.
Conning tower.....	About 90 tons.	Machine-gun proof only.	Machine-gun proof only.
Nature of protection to loading gear of big gun.	Protected by thick armor.	Protected only by machine-gun proof shields.	Protected only by machine-gun proof shields.

I will say in conclusion that as a Naval Architect I have been compelled to carefully think over the above subjects for some years past. I have endeavored to place the various issues before you in a manner devoid of technicalities, and my principal points I have demonstrated experimentally. I thank you very much for the earnest attention you have paid me, but at the same time feel it my duty to warn you that many more than the two hours we have spent together on the subject must be devoted to it by any person before his opinion can be of much value.





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## Fig. 1



Diagram of a ship's plan showing the layout of the gun deck. The ship is elongated with a pointed bow and stern. From left to right (bow to stern), the components are: a rectangular 'Cabin', a small circle labeled 'Vent', a circular 'Purret' with 'Guns run out' below it, an octagonal 'Purret', another circular 'Purret', a small rectangle labeled 'Vent', and a rectangular 'Windlass, and Anchor Gear'.

Plan of under water Protective  
Deck at after end.



Plan of under water Protective  
Deck at fore end.

*Fig. 1c.*



*Fig. 1d*

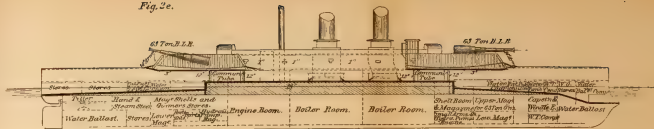








*Fig. 2e.*



*Plan of Upper Deck. Fig. 2a.*



*Plan of Protective Deck at end.*



*Plan of Protective  
Deck at end.*

Fig. 2c

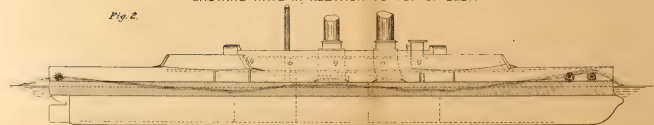


*Fig. 2d.*



CAMPERDOWN BELTED.  
SHOWING WAVE IN RELATION TO TOP OF BELT.

*Fig. 2.*

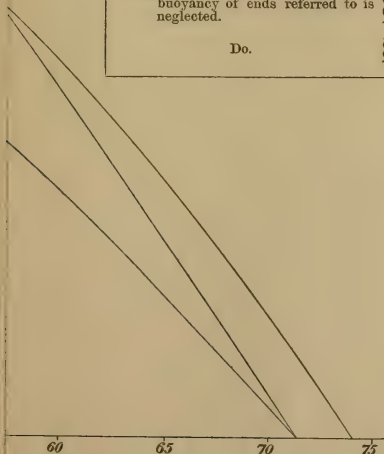






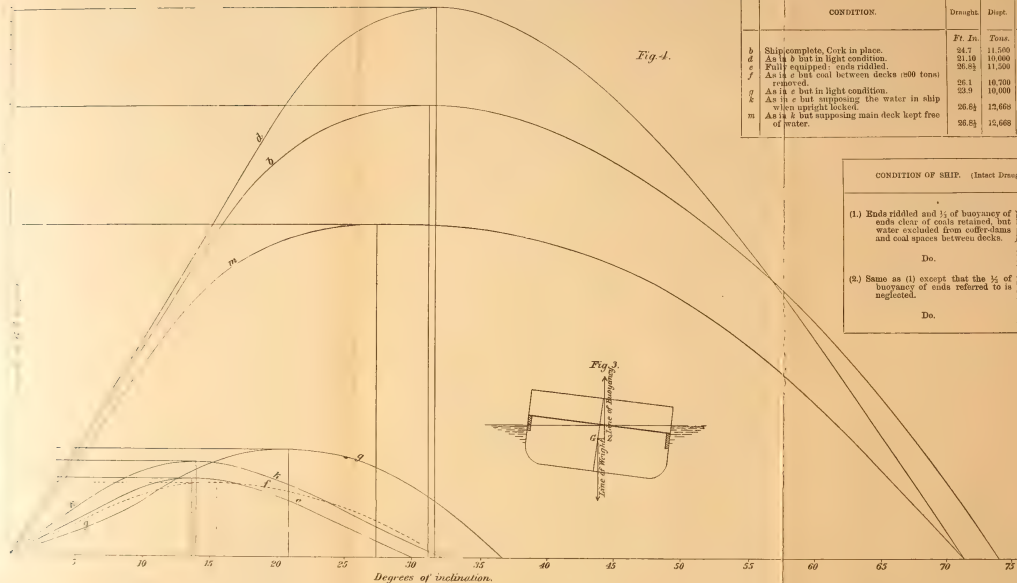
CONDITION.	Draught.	Dispt.	Deck enters water.	Angle of Max. Stab.	Max. G. Z.	Rauge.	Metacentre above C. G.
	<i>Ft. In.</i>	<i>Tons.</i>			<i>Feet.</i>		<i>Feet.</i>
complete, Cork in place.	24.7	11,500	14°	31.2°	3.28	74.3°	8.25
a b but in light condition.	21.10	10,000	18°	31.7°	3.935	71.5°	8.53
y equipped; ends riddled.	26.8½	11,500	11°	13.5°	.568	30.0°	2.0
a e but coal between decks (800 tons) moved.	26.1	10,700	11½°	15.4°	.534	32.2°	3.09
n e but in light condition.	23.9	10,000	15°	20.8°	.794	36.8°	2.22
n e but supposing the water in ship ten upright locked.	26.8½	12,668	11°	13.9°	.705	32.0°	
a k but supposing main deck kept free water.	26.8½	12,668	11°	27.4°	2.42	71.5°	

CONDITION OF SHIP. (Intact Draught 24' 7".)		Draught.		Top of middle deck above water.	
		<i>Ft.</i>	<i>In.</i>	<i>Ft.</i>	<i>In.</i>
(1.) Ends riddled and ½ of buoyancy of ends clear of coals retained, but water excluded from coffer-dams and coal spaces between decks.	} Coals between decks in.	25	4	1	3
Do.		23	7½	2	11½
(2.) Same as (1) except that the ½ of buoyancy of ends referred to is neglected.	} Coals between decks in.	25	9		10
Do.		24	0	2	7





"INFLEXIBLE."  
CURVES OF STABILITY UNDER VARIOUS CONDITIONS.



	CONDITION.	Draught.	Dispt.	Deck enters water.	Angle of Max. Stab.	Max. G. Z.	Range.	Metacentric above C. G.
		<i>Ft. In.</i>	<i>Tons.</i>			<i>Feet.</i>		<i>Feet.</i>
b	Ship complete, Cork in place.	24.7	11,560	149	31.2°	3.28	74.3°	8.25
d	As in b but in light condition.	21.10	10,000	189	31.7°	3.335	71.5°	8.53
e	Fully equipped, ends riddled.	26.8½	11,500	110	13.5°	.568	30.0°	2.0
f	As in e but coal between decks (200 tons) removed.	26.1	10,700	1149	15.4°	.534	32.2°	3.69
g	As in e but in light condition.	23.9	10,000	156	20.8°	.794	36.8°	2.22
k	As in e but supposing the water in ship when upright locked.	26.8½	15,668	11°	13.9°	.705	32.0°	
m	As in k but supposing main deck kept free of water.	26.8½	15,668	11°	27.4°	2.48	71.5°	

CONDITION OF SHIP. (Intact Draught 24' 7")		Draught.		Top of middle deck above water.	
		<i>Ft.</i>	<i>In.</i>	<i>Ft.</i>	<i>In.</i>
(1.) Ends riddled and ½ of buoyancy of ends clear of coals retained, but water excluded from coffer-dams and coal spaces between decks.	Coals between decks in.	25	4	1	3
Do.	Coals between decks out.	23	7½	2	11½
(2.) Same as (1.) except that the ½ of buoyancy of ends referred to is neglected.	Coals between decks in.	25	9		10
Do.	Coals between decks out.	24	0	2	7



Fig. 5.







## PORTS IN THE WEST INDIES.

BY LIEUTENANT CHARLES BELKNAP, U. S. N.

While navigator of a ship on the home station, I made the following notes in regard to various West Indian ports visited; and I have prepared them for the Naval Institute, in the hope that they may prove to be not without some little interest to those about to go over the same ground for the first time.

Of late years it has been the custom of the vessels in the home squadron to cruise in the West Indies during the winter months; and if, after leaving Hampton Roads, the fleet is to cruise at first in company, it will probably make its way to the neighborhood of  $20^{\circ}$  N. and  $63^{\circ}$  W. as a convenient rendezvous from which it can disperse, each vessel to pursue its allotted course. As the saving of time will naturally yield place to the saving of coal, probably the best course will be to make to the eastward, passing to the southward of the Bermudas, so that the trades may be encountered well to windward. This will easily be done during the winter season, on account of the prevailing northerly winds; in summer I think the same rule will hold good, though the opinion is held by some that the coast should be held outside the Gulf Stream well down to the 30th parallel, on account of the westerly winds then and there prevalent. If the destination be one of the Windward Islands, it will be well to keep farther to the eastward than if going to St. Thomas or Porto Rico, and to cross the 25th parallel in about  $60^{\circ}$  W. longitude, that the course may be laid to windward of the islands, where the trades will be steadier. In this case, if bound to Martinique or Santa Lucia, due allowance must be made for the westerly current which sets in very strongly, especially during fresh trades. If Barbadoes is to be visited, it is perhaps needless to say that it will be better to go there first, and thence to Santa Lucia or Martinique.

*Santa Lucia.*—Port Castries presents no difficulties that may not be avoided by a study of the chart and Sailing Directions. It is admirably situated for a coaling station; but at present, owing to the limited space, the facilities are poor. If the proposed harbor improvements are effected, it will, upon the completion of the Panama Canal, become an important port.

*Trinidad.*—Unless the trades happen to be well to the northward, the passage outside St. Vincent and Grenada is to be preferred, in order to avoid falling to leeward of the Dragon's Mouth. Port of Spain is easy of access; there are no pilots, and none is needed. After entering the gulf the vessels at anchor off the city will come into sight, and as the bottom shoals very gradually, a berth at single anchor can be taken at will. The coaling hulk Ripon is moored in fifteen feet water in about the centre of the anchorage, and may be approached as nearly as the draft of the ship will allow: the marks mentioned in the Sailing Directions are not easily recognized. There are two boat landings; one at the wharf in front of the lighthouse, the other on the pier at the southwest angle of the town. The former is the regular boat landing, but at low water it becomes impracticable for ship's boats; when intending to land at the latter, a small ladder becomes very convenient, on account of its height above the level at low water. Water for steam launches may be obtained at the last mentioned pier, and, when desired, a wrench should be carried, as the man in charge of the water is generally absent. While, on account of the distance of the anchorage from the shore, Port of Spain is not a convenient place for rating chronometers, the Gulf of Paria offers perhaps the best place in the West Indies for the determination of compass deviations.

If bound to Demerara, the Serpent's Mouth is not used, on account of the dangerous navigation, and the usual route is through the Dragon's Mouth around between Trinidad and Tobago. To the westward of the Gulf of Paria a strong

westerly current is met along the coast, and if bound to Carupano, care must be taken to avoid falling to leeward and getting embayed in the bight between Margarita Island and the main. As the coast has not been carefully surveyed, shoal water may exist between the Testigos and the mainland, and on that account the route to La Guayra will be outside those islands, and between Margarita and the Hermanos.

*La Guayra.*—Sentinel Rock forms a good landmark for recognizing La Guayra, which is further distinctly marked by the Saddle of Caracas. At dawn the mountains back of La Guayra are generally visible, later in the day they become obscured by clouds and haze; but frequently when the coast line is invisible, the Saddle of Caracas may be seen showing above the clouds. To the eastward of La Guayra is a large cultivated valley, while to the westward the coast line is rugged and uninhabited. The differences in the soundings reported are due probably to changes in the bottom caused by fresh winds and strong currents; the roadstead is limited in size, and the way to a berth must be felt by the lead. The general custom is to stand to the westward, round to and to approach the anchorage from that direction; the cathedral clock-tower bearing southeast by east (true) will lead in. During the day vessels ride to the trades, but during the night it often falls calm, and then the current is apt to turn and to be from the westward; allowance must therefore be made for the change in heading. On account of the surf, native boatmen are generally employed to transfer passengers and stores from the ship's boats to the beach. The custom is to make a contract with a couple of boatmen, and to give them a small flag to carry to distinguish their boat.

While in general the current between Curaçao and the main is to the westward, it sometimes near the land sets the other way, but feebly. Absolute reliance cannot therefore be placed upon it, and great caution is necessary in going between the ports of Curaçao and Puerto Cabello.

*Curaçao.*—The narrow entrance and the varying velocity of the current outside render access to this port difficult. While the current sometimes sets to the eastward when the trades are feeble, it generally flows to the westward with a force varying between one and three knots. As it sets directly upon the reef off the Rif Fort, care and judgment will be required to avoid touching that shoal in leaving as well as in entering. Even under the management of the authorized pilot, vessels have struck upon this dangerous obstruction, and if the port is to become of commercial importance, harbor improvements are of imperative necessity.

The name of Santa Ana Harbor is applied to the channel connecting the lagoon, or Schottegat, with the sea; at no place spacious, its width is lessened by the shipping moored alongside the bulkheads on each side. Men-of-war usually anchor in the lagoon, which, being exposed to the full force of the trades, is delightfully cool and free from mosquitoes, when compared with the anchorage in Santa Ana harbor. The bottom, however, is of soft mud with an underlying stratum of stiff clay, and if an extended stay is made, considerable difficulty may be experienced in weighing the anchor. The Dutch man-of-war which remains at Curaçao the greater part of the year lies, for the sake of convenience, in the cove on the western side of Santa Ana harbor just south of the lagoon, and it is customary for steamers before entering or leaving to blow the whistle as a warning to boats, and also if going to or from the lagoon to allow the man-of-war to come up with her bow fast, which reaches over to the eastern shore.

The Belvidere mentioned in the Sailing Directions is in ruins, and, as it is nearly hidden by other buildings, it no longer serves as a leading mark, nor is the crane or crab longer visible; it will not, however, be difficult to tell from seawards when the channel is fairly opened, as the banks or the shipping may be seen on each side. Without local knowledge a sailing vessel would require a pilot, but a steamer may enter without one, although pilotage is compulsory. The rule generally followed is to stand along the coast at a distance from one

to two miles until the channel is fairly opened, which may be known as mentioned above; then at good speed to stand in, passing the white buoy off Fort Nassau close aboard to starboard. The head sails should be ready to hoist in case, as the bow enters the still water of the harbor, the current should sweep the ship over towards the reef off the Rif Fort against the helm. The channel here is about half a cable wide, and between the forts it is still narrower, but the eastern shore may be approached to within ten or twenty yards. When abreast the forts, being then beyond the influence of the current, the vessel may be slowed down. In leaving the port it is customary when abreast the forts to go ahead at full speed, passing the buoy close aboard, having after sail ready in case the current should catch the bow and render the ship unmanageable. While there is ample depth of water in the harbor and lagoon, the shoals that encumber the entrance are serious obstacles to vessels of large draft, and until they are removed Curaçao will not attain much commercial importance, although it has an admirable situation in connection with the Panama Canal. Of late years the population has increased; phosphates have been discovered and are mined to a considerable extent, and there is considerable trade with the Venezuelan ports in the vicinity, carried on by means of small vessels of light draft. Cardiff coal may be obtained in limited quantities at about \$10 a ton; rain-water is supplied at a cent a gallon, and well-water at half a cent, but neither is fit to drink.

In leaving Curaçao for a port to the westward, the passage outside of Oruba is to be preferred, on account of the irregularity of the currents at the mouth of Maracaibo Gulf.

*Santa Marta.*—The reputation that this port has of being an unsafe anchorage, and the railway from Savanilla to Baranquilla, have combined to destroy any commercial importance it may have had. A railway to connect Santa Marta with the Magdalena river is now building, and as the depth of water is ample, wharves are to be built at the head of the bay, alongside of which vessels will be in a measure protected from the force of the furious gusts of wind which sweep down from the hills, and against which ordinary ground tackle seems to be of little avail. The land in the vicinity is incorrectly laid down upon the chart; Cuerno Point especially will be seen, when approaching from the eastward, to extend seawards much farther than might be expected from an examination of the chart. Though there is a lighthouse at Santa Marta, the light is of feeble intensity, being visible barely eight miles; and, moreover, it is not to be depended upon, as I saw it, during the short stay that the ship made, extinguished one night for over an hour.

*Savanilla.*—This is the port of Baranquilla, a town of some commercial importance upon the Magdalena river, with which it is connected by a railway. The mouth of the Magdalena is so obstructed by shifting shoals that its navigation is extremely perilous: in consequence, most of the produce of the region drained by the Magdalena finds its exit from Savanilla. The harbor is buoyed and lighted, yet the water is so shoal at such a distance from Salgar, the terminus of the railway, that it cannot be considered a convenient port. If the improvements projected at Santa Marta are completed, it is probable that that place will become commercially of greater importance than Savanilla.

*Cartagena.*—But little is known of the coast between Savanilla and Cartagena, and as the coast line is said to have been altered by an earthquake, a wide berth will be given it until it has been resurveyed. No dependence whatever can be placed upon finding the shoals in Cartagena harbor marked as indicated by the chart, which in other respects is accurate. Were the channels properly marked by buoys, there would be no necessity for taking a pilot, and it is perhaps on this account that the pilots fail to report the disappearance of the marks. But with any uncertainty in regard to the buoyage, as the Boca Chica is narrow and tortuous, and the current swift; and as the time occupied in passing through is too limited to allow of the taking and plotting of bearings, while not absolutely necessary, it would be advisable for any one unfamiliar

with the locality to take a pilot, and by firing a gun when outside the Boca Chica, one will put out from the village just inside.

The general description of Cartagena in the Sailing Directions is correct, but time has effected many changes since the volume was published. The forts are fast falling into ruins; San Fernando is scarcely visible from seawards, being hidden by bushes and trees, and its flagstaff and signal-post have disappeared, as also have Angel Fort and the outwork to the eastward of Boca Chica village. As the shores are low and covered with mangrove bushes, and as there is a lack of prominent marks, the chart will fail to convey an accurate idea of the harbor to a stranger. There is a prominent clump of mangrove bushes to the northward and eastward of Boca Chica village, and a remarkable bare patch on the hillside back of Buena Vista. Mangrove Cay and Punta Arena also are valuable marks, but beyond these little will be recognized at a glance. In case a pilot is not taken the following directions may be of some value:—

Should Long Hill be obscured by the haze, bring Sandy Point bearing about east, and stand boldly for it, recollecting that it may be approached to within 100 feet with five fathoms water, and also that at this point the current is strongest. Some beacons may now come in sight, but without previous knowledge as to their position they are as likely to mislead as to direct, for it will be difficult to determine at sight upon which of the shoals they are placed, and there will be no time to identify them by bearings. When Fort San Fernando comes in sight, round to, to give it a berth of a cable's length, and stand along the shore with the clumps of mangrove bushes to the northward and eastward of Boca Chica village a point or so on the port bow; when nearly abreast the village and with Fort San José S. by W.  $\frac{1}{4}$  W. (true), run off S.E. by E. until the bearings show that Carreya Shoal has been passed, when haul up to pass between Brujas Island and Santa Cruz Bank, leaving the three fathom patch on either side at convenience. Santa Cruz Bank will be seen even if it is not marked, as a portion of it is now nearly dry, and no difficulty will be found in passing between it and the mainland, or in avoiding the remaining shoals to the anchorage so long as it is clear weather, as they are then plainly visible. Pilots take vessels over the Carreya Bank, but the water is apt to be too much discolored to allow of the guidance of the ship from aloft, and in consequence this route could hardly be taken without local knowledge. The outer lagoon is admirably adapted to the determination of compass deviations.

*Aspinwall.*—Approaching from the eastward, a strong current setting to the southward and eastward may be experienced, and it will therefore be well to lay the course well clear of Manzanilla Point. The harbor is so crowded now-a-days that some difficulty may be experienced in selecting a berth that will afford convenient access to the shore.

From Aspinwall to Cape San Antonio, the route generally taken by steamers is to sight Old Providence Island, and passing to leeward of it and of Quita Sueño, to steer due north until abreast Thunder Knoll. If, however, it is deemed advisable to keep clear of Mosquito Bank, the course will be laid between Quita Sueño and Serrana Cay; but while in the former case, fore and aft sail may be set from the moment of leaving port, in the latter it will not probably draw before the 13th parallel is reached, when the trades begin to haul to the eastward. As the trades are apt to be fresh during the winter months, this is an important consideration. From Thunder Knoll to Cape San Antonio a current of a knot or more an hour will be met setting to the northward and westward, but the course should be laid in mid-channel, as under San Antonio the current becomes very feeble. After rounding San Antonio the remarks in the Sailing Directions in regard to the Gulf Stream, if heeded, are sufficient.

*New Orleans.*—While hardly within the title of this article, a word may be inserted in regard to the jetties at the mouth of the Mississippi. There is a shifting lump of mud outside the entrance of the jetties, and its exact position can be learned only from the pilots. Its approximate position may, however, be learned from the profile maps published each year by the commission in



charge of the improvement of the Mississippi passes, which may be obtained upon application to the officer of the U. S. Engineers stationed at New Orleans. The lump is so soft, however, that but little danger may be apprehended from striking it. There is also a shoal patch on the eastern side of the inner entrance to the jetties which may be avoided by keeping over towards the Southwest Pass side.

*Matanzas.*—The *Pan* of Matanzas marks the position of this port most unmistakably. In approaching from the westward the shore line may be followed by the eye until Savanilla Point is rounded. Coming from the eastward, the Camarioca Paps will be found about five or six miles southeast of the place assigned them on the chart. But little difficulty will be experienced in entering the bay and in taking a berth, unless it be in the sugar season, when the anchorage may be crowded with vessels. The shoals in the harbor are supposed to be buoyed, but owing to the insecure method by which the buoys are moored, no reliance whatever should be placed upon finding them in position. Moreover, as the buoys are placed inside the shoals, allowance must be made, and they must not be rounded too closely. When a buoy goes adrift, some time may elapse before it is replaced, and then the chances are that a different kind of buoy will be substituted for the one formerly occupying the position.

Maya Point is low and sandy. Upon its extremity is a cluster of white houses with red roofs; these serve to mark the point, which could not otherwise be distinguished from the adjacent shores when abeam. The east shore of the bay is not high, and is covered with a dense growth of underbrush and trees; at the head of the bay the land is low, while the west side is high and almost destitute of trees.

Underneath the slight eminence called Peñas Altas are the celebrated caves of Bellamar, and just to the westward is the suburb of Playa Judia, in which are several summer residences and resorts, painted white, and quite prominent from seaward. In the new city, the railway station, a brick building with a French roof, and the dome of the exhibition building, white, with a cupola, will be noticeable, and the city ends at the San Juan river, in a long blank yellow wall, the rear of sugar warehouses. On the ridge to the northward of Matanzas is the church of Montserrat, overlooking the valley of the Yumuri, a noted spot in Cuban scenery. The church, surrounded as it is by trees, forms a conspicuous landmark from the harbor. Two bridges connect the new city with Matanzas, and adjacent to the upper in the latter city is the market, at a point easily reached by steam launches or other market boats. The suburb of Versalles is connected by a bridge to Matanzas; in it are two noticeable buildings, the church of Virgen del Carmen, a dilapidated yellow structure with towers, and the hospital of Santa Isabel, a large rectangular yellow building, making a landmark easily recognized. An alameda extends along the shore from Versalles, but it is a poor dusty road, lined with stunted trees; some little distance beyond its extremity is San Severino Castle, a small walled fortification of a dingy grey hue, by no means so prominent as might be inferred from the Sailing Directions.

The shoals in the harbor are as marked on the chart, and not as described in the Directions. In standing in, the Sugar Loaf may be steered for on a south-west by west bearing until Maya Point opens south of the Camarioca Paps bearing southeast by east; the reef off Maya Point will then have been passed, and the course may be laid to round Sabanilla Point at a distance of from one-quarter to one-half a mile. By keeping the houses on Playa Judia shut in by Sabanilla Point, Maya Reef will be avoided. After rounding Sabanilla Point the distance from the shore should be increased, but the fringing reef will be plainly visible, and there will be no difficulty in running to the shoals which form the inner harbor. Should this appear to be crowded, anchorage may be had in ten fathoms outside the reefs, to the northward of Bajo Nuevo, the berth generally taken by merchant steamers. It will be smoother, however,

and more convenient to anchor inside Laja Bank, and as the latter is plainly visible through its whole extent at all times, no trouble will be experienced in passing around either end of it, even if it be not marked by buoys; the bottom is of stiff clay mud. In all probability more room will be found to the westward and southward of Laja Bank, as merchant vessels are anchored there only when all other berths are occupied, and in this case care must be taken to avoid the banks which extend nearly three-quarters of a mile off the southern shore. The banks here are rocky; the water shoals rapidly from ten to three fathoms, and as its color gives no sign, this part of the anchorage is very generally avoided.

The best landing for boats is on the left bank of the San Juan river just above the first bridge; but care must be taken to select a spot free from submerged piles, driven to protect the bank from the wash of passing tugboats. The stakes marking the channel into the San Juan should be left on the starboard hand, and the left (or Matanzas) bank should be closely hugged at the mouth, as a mud flat extends off the right bank nearly across. Pulling boats may land alongside the pier marked on the chart, but during the sea breeze there is generally some little sea at this point. Bearings true.

Matanzas is about three miles further east than the position given by the chart, or in approximately  $81^{\circ} 34'$  W. longitude. Before taking observations ashore, it will be necessary to obtain the written permission of the Governor, otherwise one is likely to be interrupted by a guard of soldiers and compelled to retire. Provisions are scarce and dear; coal may be procured in moderate quantities, at from \$9 to \$10 a ton; water may be had at one cent a gallon, but it is strongly impregnated with lime.

*Cay Frances.*—The land in the neighborhood of this port is difficult to recognize; but upon standing in, the cays of Santa Maria will open out and distinguish the locality. Cayman is moderately high, and between it and Cay Santa Maria is a small low cay not marked on the chart. The first noticeable mark upon Cay Frances will be several white houses with red roofs at the extreme western end; the spars of vessels at anchor may then be seen, and finally the frame for the light will be distinguished. This light is of feeble intensity, and can be discerned when eight or ten miles off with great difficulty by means of a glass. The distance it is clearly visible is too small to render it of much practical value. The lights at Bahia de Cadiz and Cruz del Padre, on the contrary, are very good ones, visible seventeen and ten miles each respectively.

*Cay Sal.*—This island is covered with bushes, and on the west side is bordered by white sand beaches, which render it visible in the night time from a distance of 2 to 3 miles. The east point of the cay terminates in a conspicuous bluff of white rock; it makes a valuable landmark, as it may be seen from a distance of ten to twelve miles through the haze from the eastward. The anchorage off the west side is in from 7 to 10 fms., hard sand bottom; in standing in for it, on no account allow the north end to be brought to bear to the southward of east, or the south end to the northward of NE. by N., as both terminate in shoals that extend off for some distance.

The anchorage on the bank to the westward of Anguila Island was, so far as observed, free from obstruction.

*San Juan de Porto Rico.*—Approaching from St. Thomas, the preferable route is to the northward of Culebra, where the wind is steadier and fresher. The port is rather difficult of access, and it must be borne in mind that the buoys on the western side of the channel are in fifteen feet water. While there is a fair amount of room in the inner harbor, the depth of water is but little over three fathoms, and the channel leading in is narrow, and it may therefore be preferable to remain in the outer harbor. Some swell may be felt there in fresh trades, but this disadvantage is counterbalanced by the foulness of the water and bottom in the inner harbor, caused by the sewerage of the town.

*Samana Bay.*—Clara Bay affords a good anchorage, though in deep water. A stream of water empties into the bay, from which the ship can be supplied.



Santa Barbara is a town of no importance except as a port of call of the Clyde line of steamers from New York to San Domingo City. There is a railway in process of construction from Las Cañitas at the head of the gulf, to Santiago, in the interior, eighty miles to the westward.

*Porto Plata.*—The limited space and the shallowness of the water render this a difficult, if not dangerous port to a vessel of any size. It will perhaps be better to lie off and communicate by means of a boat. If there is not much swell the ship may be brought up with a kedge in from twenty-five to thirty fathoms, hard mud bottom, with Owen Rock bearing west by south, and the lighthouse south by west (true) while communicating with the shore.

*Turk's Island.*—Approaching from the southward, Sand Cay should be made by daylight, when there will be no difficulty in avoiding Endymion Reef. The bank may be crossed between Sand and Salt Cays, with not less than ten fathoms; this is done regularly by the Clyde steamers, and so far as observed there were no hidden dangers. There is no good anchorage near the town on Grand Turk, but Riding Place perhaps affords more shelter, with better holding ground than any other part of the bank in the vicinity. Riding Place is south of the Commissioner's residence, a prominent house with a flagstaff and outbuildings on the beach south of English Point. Being the only house in the southern part of the island it is easily recognized. To reach this anchorage, run in for the beach about two cables south of the residence on an easterly course; bring Toney Rock in one with the south end of Grand Turk Island, and the flagstaff at the residence to bear N. by E., and drop anchor in five fathoms; this will ensure twenty fathoms of chain being upon the bank, enough to hold a vessel in ordinary weather. While anchored here the ship rode easily to fresh easterly squalls of wind for three days.

*Cape Haytien.*—A current of from one-half to one knot an hour setting to the westward and northward may be expected anywhere between Hayti and the banks to the northward, and allowance must be made in crossing. The ruins of the palace and citadel of Sans Souci, built by Christophe upon the summit of Mount Milot, some ten or twelve miles to the southward of Cape Haytien, form a good landmark for the port. No reliance can be placed upon finding the buoys in position, but the reefs in the harbor can always be seen when the water is smooth and the sun moderately high; if it be rough, the sea breaks continuously upon the weather side of all but La Trompeuse. Most of the marks mentioned in the Directions have become indistinguishable.

*Gonaïves.*—This town lies between two barren hills, Grammont to the south, Biénac to the north. On the southern slope of the latter is a remarkable vertical precipice, which, brought to bear between ENE. and NE. by E. (true), will lead into the bay clear of danger. The ruins of Fort Castries are upon the southern slope of a small hill called Mont Blanc, lying under Biénac; they are overgrown, and unrecognizable until close to, but if the clump of trees on the last mound to the southward, on Mont Blanc, be brought in one with the vertical precipice on Biénac, it will correspond to the mark mentioned in the Sailing Directions. The boat landing is alongside a wharf to the northward of the ruins of a small battery.

*Navassa Island.*—The settlement and landing place are on the southwestern side of the island, off which anchorage may be had.

*English Bay.*—Good anchorage, in fresh trades, may be found to leeward of Grosse Cay, in from five to seven fathoms.

*Jacmel.*—Between English Bay and Jacmel a current of one-half a knot an hour setting to the eastward was experienced close in to the shore. About eleven miles to the westward of Jacmel and just to the eastward of Cape Bayaneta is a town of considerable size; it lies underneath a notch in the mountain range, bearing N. by W., and is a good landmark for Jacmel, for which, owing to the general similarity of the coast as described in the Directions, it might be mistaken. Cape Bayaneta may be recognized by a line of white bluffs of even height; to the eastward of the town is another line of white bluffs, but of irregular height.

Cape Jacmel is a reddish-colored bluff, and the extremity seen from the southwest looks like a detached rock; just to the westward of it are several noticeable white chalk cliffs. Morne Rouge is the westernmost of a series of white cliffs; it is red, particularly at the top, and is square-shaped when seen from the eastward, terminating in a long chalky cliff. Patira Island is not easily distinguished.

*San Domingo City.*—If bound to this port, after leaving Jacmel, advantage may be taken in fresh trades of the current which sets to the eastward along the shore. Occasionally the trades blow a strong gale during the winter months (the season of rollers), and as under such circumstances the anchorage at San Domingo is unsafe, and communication with the shore impossible, it will be better to seek an anchorage under False Cape or Alta Vela, and to wait for the lull which follows. Off Alta Vela strong winds and a heavy sea may be met with, and hence with the ports of San Domingo and Hayti to visit, it might be better after leaving San Juan de Porto Rico to go to San Domingo City first and thence to Samana Bay, especially if the trades were light. The coast line between San Domingo City and Saona Island is imperfectly known, but if a survey disclose no off-lying dangers, the latter plan would no doubt prove the more advantageous.

The chart of the coast between Jacmel and San Domingo City (Hyd. Off. No. 36) is of little use after passing Alta Vela, as the trend of the coast only is given; the position of the ship must therefore be determined by observations. Ranges of hills extend from Alta Vela as far as San Domingo City; one to the northward of the Neiva River is noticeable, as it is to a certain extent isolated. To the westward of San Domingo City there is a high range culminating in a remarkable flat-topped peak; towards Ocoa Bay is a number of irregular conical peaks. As the land to the eastward of the city is low, it will not be seen when approaching from the westward until the city itself is recognized upon the extreme point visible to the northward and eastward. Near Nisao Point, inland, is a sugar mill with a tall, prominent yellow chimney; Torrecilla Point is marked only by the breakers off it. The church of San Carlos, a large yellow building, upon a hill to the westward of the city, is quite prominent; the fortifications are in ruins; the saw-mills marked upon the chart have disappeared, but a dye-factory has been built just to the northward of the sandspit upon the left bank. As remarked above, the anchorage at San Domingo is deemed unsafe owing to the rollers, apparently culminations of a series of waves, which sweep in with dangerous results. The trade is carried on in vessels of sufficiently light draught to cross the bar at the mouth and to enter the river, where they are protected. As the bar is continually shoaling, it is but a question of time when the products of this part of the country will find exit through some other port, probably in the vicinity of Ocoa Bay.

[The Sailing Directions referred to are *The Navigation of the Caribbean Sea and Gulf of Mexico*, U. S. Hyd. Office 1877, and *The West India Pilot*, Vols. I and II.]

NOTES ON THE NICARAGUA SHIP CANAL,  
AS RELOCATED AND REVISED BY THE U. S. SURVEYING  
EXPEDITION OF 1885.

BY ENSIGN W. I. CHAMBERS, U. S. N.

The President's annual message of last year notified the Congress that a treaty had been concluded with Nicaragua which gave the United States the right to build a ship canal across the American Isthmus within the territory of that Republic, following the most available route from ocean to ocean. Because of his previous service and great interest in this canal and his thorough knowledge of the Nicaraguan country, Civil Engineer A. G. Menocal, U. S. N., was ordered to proceed to Nicaragua to perform certain preliminary labors connected with the surveys already made, to direct particular attention to certain changes in the route which had been suggested as available for shortening the canal and diminishing its cost, and to assist in making clear to the Nicaraguan government the advantages of the treaty to that country. Civil Engineer R. E. Peary, U. S. N., and Ensign W. I. Chambers, U. S. N., were ordered to assist him.

The report of this Expedition may be regarded as a supplement to that of Commander E. P. Lull, U. S. N., of the work done and the results obtained by the U. S. Surveying Expedition in 1872 and 1873, and therefore does not dwell on the full description of the country, the inhabitants and other salient features contained in the latter; but it is voluminous and clear in its narration of the work done and the success achieved by the small party during three months of constant and hard surveying work in that country. As considerable delay is anticipated in reproducing the drawings and photographs of Mr. Menocal's report, it is thought that an abstract of its salient features will be acceptable to the Institute in this number of the Proceedings.

FITTING OUT AND SAILING OF THE EXPEDITION.

The expedition sailed from New York December 20, 1884, arrived in Panama December 30, and while waiting for the U. S. S. Lackawana to prepare for sea, employed the time in examining the progress of work on the Panama Canal.

Arrived at Corinto on January 7, 1885, and in company with Captain A. P. Cooke, U. S. N., and other officers of that ship, paid an official call on the President of Nicaragua, at Managua, who extended a cordial welcome, and emphatically expressed the hope that the American Congress would ratify the pending canal treaty, and that he would be fortunate enough to see the work inaugurated during his administration. Arrived at Grenada January 13, where a force of natives was hired to complete the personnel of the expedition. On the 19th parted company with the officers of the Lackawana, and left Grenada by the regular lake steamer, having been joined by P. A. Surgeon John F. Bransford, U. S. N. Several delays were experienced on the river in making connections with the steamers, but the party arrived at the confluence of the Rio San Juan with the river Sarapiquí, the point of preliminary operations, January 22.

## FIELD WORK.

Colonel O. W. Childs in 1850-51 and M. Blanchett in 1879 had proposed to convert the river San Juan, above its junction with the Sarapiquí, into an extension of the lake, by the construction of a dam 74 feet high at that place, thereby reducing the length of the canal excavation, from the dam to Greytown, to 21 miles. Three days of observation at this place established beyond a doubt that to raise the water of the San Juan by a dam at that point was impossible, and that any further exploration at that point would be useless.

The other proposed change consisted in locating a line from Greytown direct to the valley of the river San Francisco and through this valley to the river San Juan. Accordingly camp was moved to the mouth of the river San Francisco, and a transit and level line started up the valley of that stream and one of its principal tributaries coming from a northeasterly direction. This line was pushed with much labor over ground alternately swampy and hilly, and covered with a dense vegetation through which every foot of the trail had to be cut with the machette, and where travelling was fatiguing in the extreme, officers and men being compelled in many instances to go over long distances buried to the waist in mud and water with a very uncertain bottom to stand upon. Systematic reconnoissances were made at all main branches of the San Francisco contained in the basin, and the camp was again shifted up the principal branch coming from the east; from which base a thorough examination was made of the country about its head-waters, and the transit and level advanced across the lowest depression of a "divide" separating them from the waters flowing from a northeasterly direction towards the low lands and the lagoons about Greytown. The instrumental examination of these streams showed very favorable indications for the location of a canal, both on account of their direction and the features of their valleys.

The work of exploring the dividing ridge is referred to in detail in the report, so as to show that the selection of the pass and the location of the canal lines was not decided on in haste, but was the result of a thorough investigation, and mature consideration of all the facts connected therewith. The survey was continued in spite of many privations, hardships and copious rains, down the eastern slope. 12 miles of offsets to the main line were run on either side of the line and the topography of the country thoroughly delineated. The time fixed for the return of the expedition was nearly up, and the line was stopped at a point 29 feet above sea level and separated from the lagoons of Greytown by about 8 miles of low and level country, but this line was afterwards connected by Mr. Peary by running a line towards it from sea level at Greytown, while the work of connecting it from the site of the dam was in progress, and after telegraphic permission had been received to continue the work for another month. The country in the vicinity of the confluence of the rivers San Carlos and San Juan was next examined with a view to finding a suitable site for the dam across the latter, and after a week's exploration an excellent location was made near Ochoa, between two steep and rocky hills on opposite sides of the river, which is here 1133 feet wide, with an average depth of 6.6 feet hard bottom. After careful examination was made to be sure that these hills were spurs of ranges extending to the mountains in the interior, camp was again shifted to a point near this site, and the transit and level line started from the left bank of the river in a northeasterly direction to connect with the previous line in the valley of the river San Francisco. This work was continued with great labor through jungles over the spurs of hills and across extensive swamps for 4 miles into the valley of the west branch of the river San Francisco, when the base of supplies was again shifted to the mouth of that river, and the camp pushed up to within 5 miles of the end of the line. After this the survey was rapidly advanced and the whole instrumental connection completed between the site of the dam at Ochoa and Greytown, a distance of about 30 miles. Numerous observations of prominent ranges and peaks were taken by cross



bearings from the tops of high trees in elevated positions on the line, which assisted materially in the delineations of the topography of the country.

The party started to return April 26, 1885, by way of Granada, Leon, Corinto and Panama, at which place while waiting six days for the sailing of the steamer for New York, thorough examination of the Panama Canal in detail was made.

Arrived in New York June 2, and on July 17 commenced the preparation of the extensive maps and plans, the result of their work.

#### THE PROPOSED ROUTE.

The proposed route extends from the harbor of Greytown on the Caribbean Sea to Brito on the Pacific. Its total length is 169.8 miles, of which 38.98 miles will be excavated canal and 130.82 miles navigation by Lake Nicaragua, the river San Juan, the basin of the river San Francisco, and seven locks.

The Lake (or inland sea) of Nicaragua is about 90 miles long and forty miles wide, and will be connected with the Pacific by a canal, and with the Atlantic by slack water navigation in the river San Juan, by a short section of canal from the river San Juan to the basin of the river San Francisco, navigation through this basin, and by a canal thence to the Caribbean Sea.

The route has been divided into three Divisions: the Western, the Middle, and the Eastern.

The *Western Division* extends from the western shore of the lake to the port of Brito on the Pacific, a distance of 17.27 miles. It leaves the lake at the mouth of the river Lajas, the channel of which it follows for about a mile and a half, and then crosses a plain three-fourths of a mile wide and enters the valley of the Guscoyol, a small tributary of the Lajas, proceeding from the summit, which it follows to the highest point, 4.7 miles from the lake and 41.4 feet above its surface, a valley about two miles wide. The line then descends at the rate of about nine feet per mile over a moderately undulating country, and in one and three-quarter miles meets the Rio Grande, a large mountain stream which drains an extensive area of the eastern slope of the Cordillera. This stream is to be diverted into the lake, through the river Lajas, which is also to be diverted, so as to have its channel free for the canal. The line of the canal then follows the valley of the tortuous Rio Grande by curves 4500 and 4000 feet radii, and in about one and a half miles it frees itself from the hills on either side and runs through a broad valley as it curves towards Las Serdas. This point is 8.94 miles from the lake, and is the junction of this route with that of the Rio del Medio, recommended by the expedition of 1872-73. Beyond Las Serdas the canal follows the valley of the Rio Grande with an average inclination of nine feet to the mile for a distance of 8.33 miles to Brito. Along this section the canal cuts projecting bends of the river at four different points, artificial channels being in those cases provided for the river.

It is proposed to pass the Tolo river and several small watercourses across and under the canal, as the bed of the river is at all points—between Las Serdas and Tolo—several feet below the water in the canal, and seven waste-weirs are proposed for the discharge of surplus water. Ditches are proposed along the lower portion of the canal to intercept the surface drainage and convey it to the sea. To descend from the level of the lake to that of the sea at Brito, four locks are proposed, the lower of which may be situated one and a quarter miles from the harbor, which distance is practically an extension of the harbor, where ships may lie or pass each other.

The other locks are located with advantage to foundations and economy in excavation, the lifts for all four being 26.4 feet, 29.7 feet, 29.7 feet, and 24.2 to 33.18 feet, respectively, the variable lift of the latter being due to variations in the state of the tide at Brito.

The *Middle Division* extends from the western shore of the lake to the western slope of "the divide" between the basin of the river San Francisco and that of

the river San Juanillo. The total distance is 133.05 miles, and may be divided as follows: Lake navigation 56.5 miles, navigation by the river San Juan 64.54 miles, navigation through the basin of the San Francisco (including three short sections of canal, amounting to three miles) 12.01 miles. The lake navigation extends from the mouth of the river Lajas to the head of the river San Juan at Fort San Carlos. At the mouth of the Lajas some rock excavation and dredging will be required for a distance of 2000 feet. From this point on the west side of the lake to within eight miles of its outlet it is deep and free to navigation. In those eight miles, dredging in soft mud to a depth of three and a half feet will be required to secure the proposed depth of 26 feet. Along that distance a channel 150 feet wide at bottom has been estimated for. It is proposed to obtain slack water navigation at the river San Juan by the construction of a dam 52 feet high at Ochoa, 64 miles from the lake, and with a fall of three-quarters of an inch to the mile for that distance; that portion of the stream will be practically an extension of the lake, where, with the exception of the first 28 miles, from the lake to Toro Rapids, the navigable channel will be at no point less than 1000 feet wide, with a depth varying from 28 to 130 feet. Between the lake and Toro Rapids, rock blasting under water and dredging to a mean depth of cut of four and a half feet will be required at several places, amounting in the aggregate to 24 miles. The average depth of water as raised by the dam over the shallow places where deepening has been estimated for is 26 feet deep by 125 feet wide at bottom.

The dam is located between two steep and rocky hills, and its effective length on the crest will be 1255 feet. The mean depth of water in the river at this site is but 6.6 feet and the maximum 17 feet close to the right abutment, and rock underlies the gravel and sandy bottom. The foundations have been estimated at 20 feet below the surface of the water throughout the whole distance and across the entire body of the dam, to be of cement concrete, with a wood lining on top and lower side. A strong apron is proposed to prevent undermining by the fall of the water.

On the left bank of the river immediately above the dam, a break in the hills forms the valley of the small river Machado, and just in the rear of the range, the last spur forms the right abutment of the dam. Another narrow valley extends easterly from that of the Machado. The first valley offers an excellent entrance to the canal, free from the influence of river current; and the latter has been taken advantage of for a distance of 3300 feet, as a portion of the canal itself. From the head of this valley the canal cuts across a broken country of moderate elevations confined by high hills, then soon falls into a deep narrow ravine discharging into the San Juan, where a short embankment is proposed, so as to preserve the summit level in the canal. In a distance of 1.82 miles from the beginning of the cut at the entrance valley, the canal enters the basin of the river San Francisco, which it follows to the foot of "the divide" and the end of the Middle Division. It is believed that this basin extends from the base of the divide to within one and three-quarter miles of the valley in rear of the dam at Ochoa, and that by making a short detour to the north of the line of survey, it will be freely navigable throughout that distance. It is proposed to retain the summit level as established above the dam, throughout this basin, by an embankment 6500 feet long on the crest and 51 feet maximum depth, connecting the ranges of hills which confine the waters of the San Francisco. This deep broad basin is regarded as a striking feature in this route, not only from economical considerations, but because it affords unrestricted navigation for 8.5 miles, and presents a favorable solution of the important problem of drainage. The water in this basin, which does not pass through the locks in the Eastern Division, will either back through the canal into the river San Juan and over the dam, or discharge over a waste-weir 1000 feet long cut through the hill at the southeast extremity of the embankment. There will also be cut through this same hill, for use in emergency, a tunnel controlled by gates, and large enough to discharge the whole flow of the San Francisco in floods, or even empty the basin if necessary.



The *Eastern Division* completes the line of canal to Greytown, a distance of 19.48 miles. Within this distance is comprised 63 per cent. of the total excavation, and 61 per cent. of the total cost of excavation for the entire canal, and being an entirely new location, with essentially new features, merits a full description.

Beginning at the eastern extremity of the proposed inland lake in the San Francisco valley, the canal runs nearly due east through a broad flat valley, a distance of about 1600 feet, the average elevation being 125.1 feet above sea level, or 19.13 feet above the level of the canal. Thence across projecting spurs, "the divide" is reached at an elevation of 280 feet in a distance of 4600 feet from the before-mentioned basin of the San Francisco. The line then curves with a radius of 10,733 feet for a distance of 2500 feet across the little plain at the summit, cuts a steep narrow spur, enters the valley of a stream flowing towards Greytown, called Deseado, the bed of which it follows a short distance, then across to the left bank of that stream, and reaches the site of Lock No. 3, in a rocky spur of the northern hills 14,200 feet distant from the canal level on the other side, the average cut for this distance being 119.5 feet above the water in the canal.

The summit level stretching from Lock No. 4 beyond the lake—a distance of 144.8 miles—ends at Lock No. 3, where the level of the canal drops 53 feet through the solid rock. Passing by easy curves of 4800 and 5280 feet down the winding valley of the Deseado, Lock No. 2 is reached 4600 feet from Lock No. 3. This lock drops the canal 27 feet, and at this lower level it passes along the still widening and gradually sloping valley of the Deseado in a north-easterly direction, a distance of 1500 feet, to Lock No. 1, which lowers it 26 feet to the sea level, and from which it crosses the flat basin of the San Juanillo, cutting that stream in several places, and passing through the swamps of the lagoon region to the harbor of Greytown, a distance of 6100 feet, the average height of surface above tide level from this latter distance being 10.5 feet.

The drainage area occupied by the canal of the southwestern side of "the divide" is very limited, and the waters by means of two short channels will be diverted into the basin of the San Francisco. On the northern and eastern sides of the divide to a point within 4000 feet of Lock No. 3, the natural drainage is away from the canal, the Deseado flowing nearly parallel to and from 500 to 1300 feet north of it. At this point the Deseado will be divided by a channel north of the canal, and from here to its last intersection with the canal, a distance of 43,000 feet, the latter will be protected on both sides by drainage channels formed partly by the present bed of the stream and partly by artificial ditches. The remainder of the canal, also about 43,000 feet, from the Deseado to the sea will be protected by embankments, an artificial channel being cut south of the canal to divert the river San Juanillo, and another north of the canal to give Laguna Bernard and its tributaries an independent outlet to the sea.

Through the "divide," rock underlying a few feet of earth may be counted upon the entire distance; from Lock No. 3 to Lock No. 1, loose earth, gravel, clay and rock in the deeper cuts; while from Lock No. 1 to Greytown, a distance of 12 miles, nearly if not all material will be dredgable. This latter portion (12 miles) of the canal, from the lowest lock to the sea (as at Brito), may be regarded as practically an extension of the harbor.

#### DIMENSIONS OF THE CANAL.

The apparent insufficiency of the Suez Canal to accommodate a traffic of more than 6,000,000 tons a year without serious delay to navigation, due to its reduced sectional area and an inadequate number of turnouts, shows that the dimensions proposed in previous reports for a canal across Nicaragua should be considerably enlarged. It is proposed now, not only to enlarge the water prism of the canal, by increasing its width and depth, but to provide also two large basins at the extremities of the locks where vessels can wait or pass

without delay. These turnouts, together with the lake, the river, and the San Francisco basin, will greatly facilitate navigation by this route, and allow ships going in opposite directions to pass each other at almost all points. These modifications will necessarily involve an increase in the estimated cost of the canal, but it has been thought best to provide for the unrestricted passage of the largest vessels of commerce, and a traffic of not less than 12,000,000 tons per year.

The following are the respective dimensions and salient features of the canal proposed in 1872-73, and that herein estimated for:

## FEATURES COMPARED.

	Location of 1872-73.	Location of 1885.
Total distance (Greytown to Brito).....	180.76 miles.	169.8 miles.
Length of actual canal or cutting required...	61.7 "	40.3 "
Height of summit level above mean sea level	107 feet.	110 feet.
Length of summit level.....	102 "	144.8 "
Number of dams.....	4	1
" locks.....	21	7
Length of lock chamber.....	400 feet.	650 feet.
Width of ".....	60 "	65 "
Number of curves in actual canal.....	26	14
Minimum radius of canal curves.....	2200 feet.	4000 feet.
Length of canal in curves.....	12.2 miles.	10.8 miles.
Depth of water in canal .....	26 feet.	28 and 30 feet.
Width of bottom in that part of San Juan where dredging is required.....	80 "	125 feet.
Do. Lake Nicaragua.....	80 "	150 "
Do. rocky cuts.....	72 "	80 "
Do. deep earth cuts.....	50 "	80 "
Do. terminal cuts.....	72 "	120 "
Time allowed to pass through locks alone, allowing { for old design, 30 minutes. } ...	10.5 hours.	5.3 hours.
Turnouts at extremities of locks 650 feet by 150 feet at bottom.....	None.	12
Time required for ship to pass from Grey- town to Brito.....	37 hours.	30 hours.
Estimated cost (computed on same basis)....	\$52,577,718	\$39,040,134
Estimated cost according to new dimensions and increased prices .....		\$51,234,958

Provision has also been made for illuminating the whole route sufficiently to insure safe navigation at night. Greater speed can be made in the canal both on account of its enlarged dimensions and the protection of the slopes by stone pitching wherever necessary. Several bends in the river have been cut off, and easier navigation thereby secured.

## THE LOCKS.

The proposed locks have a uniform length of 650 feet between gates, and a least width of 65 feet between the gate abutments. Locks Nos. 1, 2 and 4, 5 and 6 have lifts of 26 feet, 27 feet, 26.4 feet, 29.7 feet and 29.7 feet respectively. No. 3 has a lift of 53 feet, and No. 7, being a combination of tide and lift lock, its lift will vary between 24.2 feet and 33.2 feet, depending on the state of the tide. No. 3 will be cut out of the solid trap rock and the rest made of concrete, and all locks will have a heavy timber lining from top of walls to 15 feet below low water level. Cribbs or fender piles will

be placed at the approaches, and provision has been made for making ships fast to floats in the lock walls, so that the lines may rise or fall with them, and thus preserve an equal tension on the fasts. Each lock will be filled or emptied by two conduits, each ten feet in diameter, extending along the sides of the locks from the upper to the lower reach of the canal, and 22 branch culverts, eleven on each side, connecting them with the lock chamber. Each main culvert will have an upper and a lower valve or gate to admit or to exhaust water. The time required to fill or empty Lock No. 3 will be 15 minutes, and the others an average of 11 minutes. Two styles of gates have been designed, one sliding and the other rolling, both capable of being worked quickly and safely, while providing economy of space and power and facility of removal or repairs, with strength, simplicity and economy of cost.

## CAPACITY OF THE CANAL.

In order to estimate with a fair degree of precision, both the traffic-carrying capacity of the canal and the time of transit, the report compares the dimensions of the Suez Canal with those of the proposed canal. It shows that vessels of 4400 tons, 400 feet long, 52 feet beam, and drawing 22 feet of water, can go through the Suez Canal with an average speed of 6 statute miles per hour, and that the speed of smaller vessels varies between 6 and 8 miles per hour. A table is added showing the dimensions proposed for the Nicaragua Canal in the several sections into which the route has been subdivided, which is taken as a basis for computing the traffic-carrying capacity of the canal and the effective sailing time from ocean to ocean. An inspection of this table shows that in 22.37 miles, or 57 per cent. of the excavated canal, the prism is large enough for vessels in transit to pass each other, and of a sectional area in excess of the maximum in the Suez Canal. The remaining distance in which large vessels cannot conveniently pass each other is so divided that the longest is only 3.67 miles in length. That, with two exceptions, those short reaches of narrow canal are situated between the locks, and can be traversed by any vessel in less time than is estimated for the passage of a lock; consequently, unless a double system of locks be constructed, nothing will be gained by an enlargement of the prisms. The exceptions referred to are the rock cuts through the eastern and western divides, 2.58 miles and 3.67 miles respectively. Both the bottom width and the depth of the proposed canal are larger than those of the Suez Canal, even in these two short cuts.

In the lake and in the greater portion of the San Juan, vessels can travel as fast as at sea. In some portions of the river the speed may be somewhat checked by reason of the curves.

## ESTIMATED TIME OF TRANSIT.

	(Maximum.)	Hours.
38.98 miles of canal (at 5 statute miles per hour).....		7.48
8.51 miles in basin of San Francisco (at 7 statute miles per hour).....		1.14
64.54 miles in San Juan River (at 8 statute miles per hour).....		8.04
56.50 miles in Lake (at 10 statute miles per hour).....		5.39
For passing 7 locks (45 minutes each).....		5.15
Allow for detention .....		2.00
Total time. ....		30.00

The traffic of the canal is limited by the time required to pass a lock, and on the liberal basis of 45 minutes above estimated, and allowing but one vessel to each lockage, the number of vessels that can pass in one day will be 32, or in one year 11,680; which at the average net tonnage of vessels passing the Suez Canal, will give an annual traffic of 20,440,000 tons. This is on the

basis that the navigation will not be stopped at night. With abundant water power at the several locks, at the dam, and through the "divides," there is no reason why the whole canal should not be sufficiently illuminated by electric lights, and with beacons and range lights in the river and lake, vessels can travel at all times with perfect safety.

#### MATERIALS OF CONSTRUCTION.

Considerable space is devoted to showing the abundance of fine timber for all purposes, the prevalence and quality of the rubble masonry and cement of the country, the excellent quality and great quantity of granite, trap rock and brick clay for construction purposes in the country throughout the line of the canal.

#### CLIMATE, RAINFALL AND HEALTH.

Numerous statistics and authoritative opinions are quoted, to show the average temperature and rainfall, and that the climate is comparatively healthy. Not one of the party was affected by sickness due to climatic influences, although its work was confined to what is generally regarded as the most unhealthy portion of the country.

#### WATER SUPPLY.

Some space is devoted to showing from careful observations, that the supply of water from the great inland equalizing reservoir, Lake Nicaragua, will be more than ten times enough at the lowest and driest state to supply the traffic of the canal at 32 lockages per day.

#### HARBORS.

No changes are proposed in the methods submitted in Captain Lull's report for the improvement of the harbors at the termini of the canal; but the change of location of the tide lock near Brito to a place 1.4 miles inland, will simplify the difficulties at that place and will render a large bay for the accommodation of vessels at anchor unnecessary.

#### THE ESTIMATES.

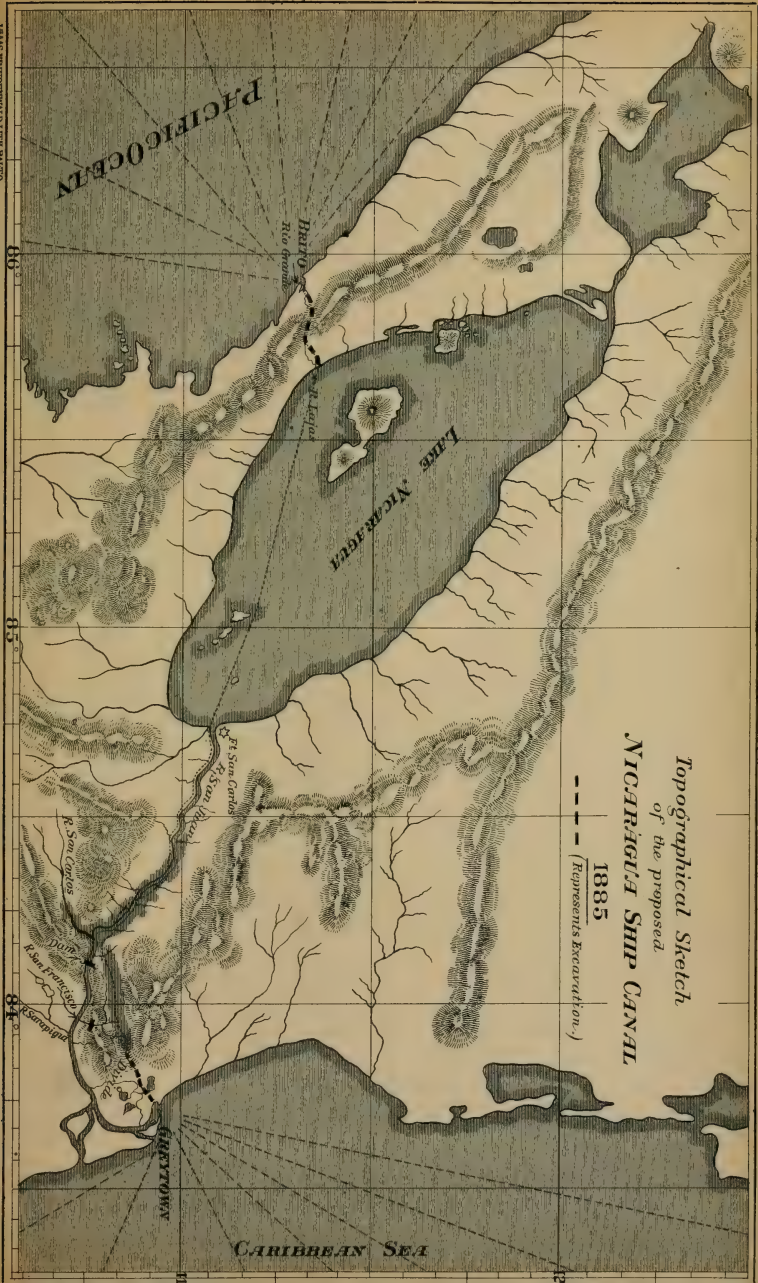
The estimate of the cost of the canal has been prepared after careful computations of all the works required for the completion of the canal and its accessories, from data obtained by an actual instrumental location of the line, after searching examinations and a full appreciation of the topography of the country. The surveys have been conducted with the utmost care, and sufficiently in detail to insure a close estimate of the cost of the work. The estimate is complete in its attention to all the details necessary to equip and complete the work. The prices adopted are believed to be sufficient to cover the work under any possible unfavorable circumstances, if controlled by an intelligent and business-like management. It is estimated that the canal can be completed in six years, and will cost, including a contingent of 25 per cent. added, \$64,043,697.

Eleven sets of drawings, a report on the geological specimens collected by the party, and 56 photographs of interesting features in the country, accompany this report.



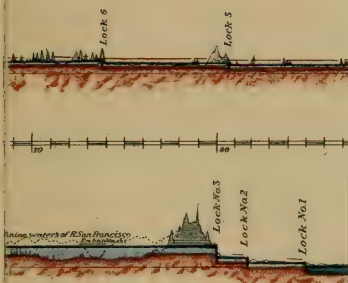
*Topographical Sketch  
of the proposed  
NICARAGUA SHIP CANAL  
1885*

----- (Represents Excavation.)

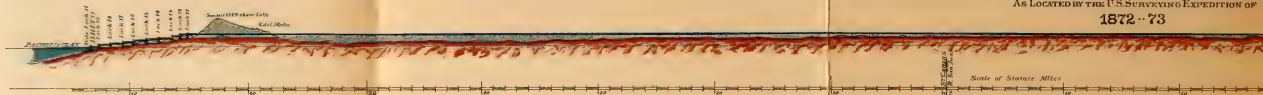




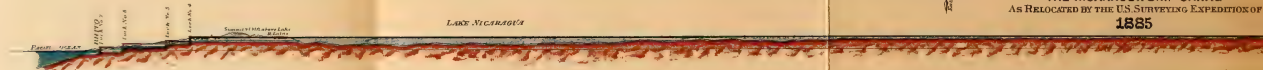




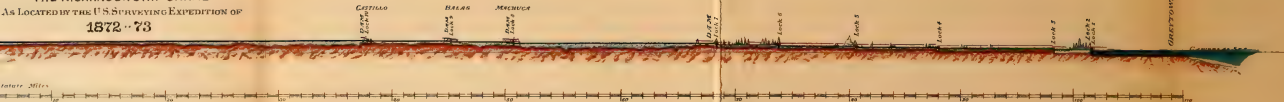
PROFILE OF  
THE NICARAGUA SHIP-CANAL  
AS LOCATED BY THE U.S. SURVEYING EXPEDITION OF  
1872-73



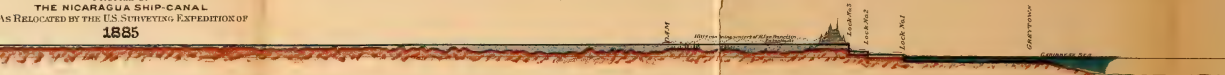
PROFILE OF  
THE NICARAGUA SHIP-CANAL  
AS RELOCATED BY THE U.S. SURVEYING EXPEDITION OF  
1885



PROFILE OF  
THE NICARAGUA SHIP-CANAL  
AS LOCATED BY THE U.S. SURVEYING EXPEDITION OF  
1872-73



PROFILE OF  
THE NICARAGUA SHIP-CANAL  
AS RELOCATED BY THE U.S. SURVEYING EXPEDITION OF  
1885



PROPOSED TRANSVERSE SECTIONS





## REPORT ON BAIRD'S STEAM STEERING GEAR.

U. S. NAVY YARD, WASHINGTON, D. C.,  
December 29, 1884.

SIR:—In obedience to your order of December 2, 1884, the Board has carefully and thoroughly examined the plans and working model of the Steam Steering Apparatus designed by P. A. Engineer Geo. W. Baird, U. S. N., and submit the following report:

The device consists essentially of a hollow metallic drum as shown at *A*, Fig. 1, on the accompanying cut, part in elevation and part in section, supported on suitable bearings *B B*, and fitted at one end with a hand-wheel *C*, and at the other with an ordinary cycloidal or friction gear-wheel *D*. The gear-wheel *D* works into a corresponding gear-wheel *E*, firmly secured to a shaft that receives its motion from a pair of engines with cranks set at right angles. On the prolongation of the axis of the drum a screw thread is cut and fitted into a nut *F*, to which is attached the end of a floating lever *G*, that operates the piston reversing valve *H*, for admitting steam to the engine. A nut *I* is connected to the middle of the lever *G*, in which the screw *K* is turned by means of the gear-wheels *L* and *M*, which receive their motion through the shaft *N*, from the steam hand-wheel *O*. The reversing valve *H* is fitted with only sufficient lap to insure a complete closure of the steam and exhaust ports when it is in its middle position. When the device is properly adjusted for its work, the reversing valve *H* is in middle position, the nuts *F* and *I* are in the middle of the lengths of the threads on which they work, and the floating lever *G* is normal to the axis of the drum, while the tiller is amidships and the wheel ropes are wound tightly around the drum *A* in the usual manner.

The following is its mode of action:

The hand-wheel *O* being turned in any required direction, gives a corresponding motion to the reversing valve *H*, through the intervention of the shaft *N*, gear-wheels *L* and *M*, and the nut *I* on the screw *K*. When the valve *H* is opened the engines are set in motion, and through the gear or friction wheels *D* and *E*, revolve the drum *A*, upon which the tiller ropes are coiled. But when the drum *A* revolves, the nut *F* moves along its thread and carries with it the end of the floating lever *G*, in a direction to stop the engine.

The parts are so proportioned that whatever angle of motion is given to the hand-wheel *O*, it will immediately be followed by a corresponding motion of the drum, and the engines will automatically stop by the closure of the reversing valve when the same angle of motion has been reached; and in the case of a sea striking and carrying the rudder with it through any given angle, the drum will be caused to revolve through a corresponding angle by means of the wheel ropes, and thereby open the reversing valve and start the engine as soon as the excessive impact of the sea has expended itself, and will again stop automatically when the rudder is brought to the angle indicated by the hand-wheel.

The small working model, which was tested by steam, was fitted with ordinary cycloidal gear-wheel for communicating motion to the drum from the engine shaft, which received its motion from the two small oscillating cylinders.

The whole arrangement was neat, compact, and accessible in every part, and worked with rapidity and certainty. In case of derangement or accident to the steam mechanism, provision is made for disconnecting it by fitting the key *P* so that it can be readily withdrawn to allow the drum *A* to revolve freely within the gear-wheel *D* as a bearing; the device then becomes an ordinary steering gear with *C* for a hand-wheel. The design embraces some modifications of the detail which are not essential to the effective working of the device, but may be regarded rather as a matter of convenience or individual choice; such as the employment of a single wheel fitted with suitable clutches

for both steam and hand steering, and either the use of the ordinary cycloidal gear-wheel or the noiseless friction wheel for transmitting the power to the drum.

When the latter is employed, provision is made for taking up the wear of the friction wheel by resting the bearings *B* and *B* on keys or wedges as shown on Fig. 2, that can readily be backed, and the friction between the faces can then be regulated to any desired amount by setting on the cap-bolt nut. In the opinion of the Board the device is simple and ingenious in design, consists of few parts, is not liable to get out of order, and acts with celerity and precision; again, as the parts of the steam-steerer are so proportioned that the movement of the steam hand-wheel is identical with that of the ordinary steering gear, any one who can steer a vessel with the ordinary wheel can have no difficulty in steering with the device, however unfamiliar he may be with the manipulation or use of machinery.

Although the Board is of the opinion that the Steam Steerer in question will be found upon trial to be a valuable and reliable device for the purpose for which it was designed, yet it cannot recommend its purchase for use in the Naval Service until it is proved so to be by a thorough practical trial in steering a vessel under different conditions of wind and sea, and to that end the Board recommends that a Steam Steerer, of the above design, be purchased and fitted on board some sea-going vessel of the Navy for trial.

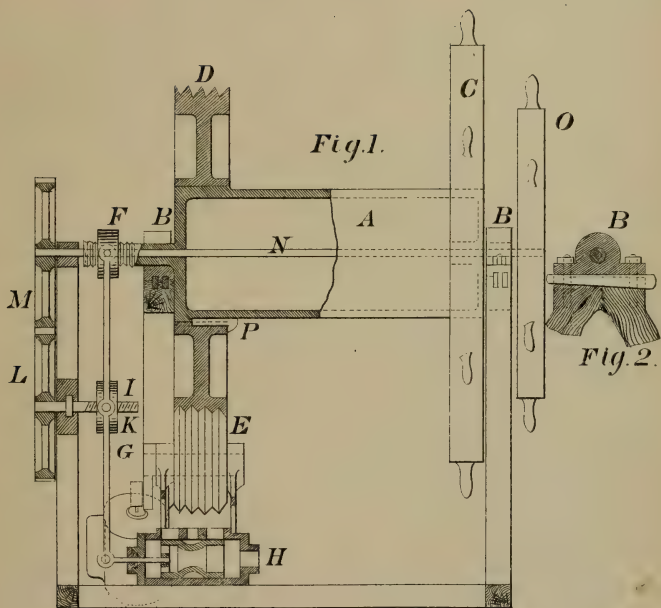
We are, sir, very respectfully, your obedient servants,

DAVID SMITH, U. S. N.,  
*Chief Engineer.*

A. KIRBY, U. S. N.,  
*P. A. Engineer.*

Commodore A. A. SEMMES, U. S. N.,  
*Commandant.*







## BOOK NOTICES.

No publication will be noticed under this head unless a copy for the Institute Library is sent to the Secretary, at Annapolis, Md.

### A PAPER ON TIDAL THEORY AND TIDAL PREDICTIONS. By E. A. Gieseler, Superintendent of Construction, Fourth Light House District.

The first part of this paper contains an exposition of the Newtonian Theory of the Tides, and describes concisely the phenomena which naturally result at any point of the earth's surface upon this theory, as the sun and moon vary their relative positions, and their distances from the earth and from the zenith of the observer. The second part of the paper is on Tidal Predictions. The system proposed for predicting time of high, or low, water for any individual case consists simply in adding to the mean lunitidal interval of high, or low, water, certain corrections for the hour of the moon's transit, for declination, and for parallax of the heavenly bodies.

By means of several thousand tidal observations at Cape Henlopen, Delaware Bay, the corrections in time and height of tides at that point, for hour of moon's transit, declination of sun and moon, and lunar parallax have been determined. The general method of deducing these corrections consists in grouping the observations in such a way that two groups will render means in which the sidereal conditions are alike with one exception. Then the inference is justified, that the difference, either in time or height of the tide, found in the means of the observations is due to the difference in that one of the sidereal conditions which differs in the two groups. For example, in two groups of observations the hour of moon's transit and the lunar parallax are nearly the same, but the sun's declination differs, therefore the difference observed in the time and height of the tide is ascribed to the variation in the sun's declination. All the corrections deduced in this way are tabulated, and are used in predicting the time of high or low water, as follows :

Prediction of the time of high water at Cape Henlopen on the morning of May 27, 1884 :

(1) Astronomical time of generating lunar transit .....	May 26	14 hrs. 19½ m.	
(2) Lunitidal interval, including correction for 60' lunar parallax.....		7	59
(3) Correction for sun's declination 21° north		+ 0	5
Astronomical time of high water.....	May 26	22	23½
Civil time of high water.....	May 27	10	23½ A. M.
Time of high water as actually observed.....	May 27	10	15 A. M.

The system is minutely and fully explained and illustrated. If developed, it will supply much useful information in regard to the tides.

B. F. T.

### THE CRUISE OF THE ALBATROSS.

This pamphlet, published by the Mittheilungen a. d. Gebiete d. Seewesens, Pola, gives an account of a fourteen months' cruise of this Austrian gunboat in the Red Sea and in East Indian and Chinese waters. The first part is devoted to hydrographic and meteorologic information in regard to the various ports

visited, and to sailing directions for the passages between them; while the second part treats of the commercial statistics of the ports with descriptions of them. Track charts are appended.

R. S.

#### HAND-BOOK OF THE HOTCHKISS RAPID-FIRING GUN.

This pamphlet, issued by the Hotchkiss Co., is most valuable. It contains complete descriptions of the three calibres now in use, together with directions for mounting and dismounting, care and cleaning required, nomenclature and description of the ammunition, nomenclature and description of the Non-Recoil Mount, gun exercise for the three calibres, stations for the care and cleaning of the guns, a chapter on accidents to mechanism, and an aiming drill with full directions for the training of the crews in marksmanship. Firing and penetration tables are also given, and a table of weights and measurements.

R. R. I.

#### DIE DEUTSCHEN UNTERNEHMEN IM SYSTEME DER INTERNATIONALEN POLAR-FORSCHUNG. Berlin, 1884.

The contents of this volume are taken from the Proceedings of the 4th German Geographic Congress, which was held in Munich, in 1884. Dr. Neumayer in the first paper briefly reviews the work done at German stations, especially at the stations on Cumberland Sound at Kikerton and Kingawa Fjord, in 1882-3, under the command of Dr. Giese, and that at the South Georgian Islands under Dr. Schrader. These stations were established under the auspices of the German Polar Research Commission, and the results of the observations are briefly indicated by Dr. Neumayer. The paper concludes with an earnest plea for concerted action by the different governments in establishing observation stations in the polar regions. The remaining papers, by Captain Koldewey, who commanded the Germania expedition in 1869 and 1870, and Dr. Börgen, are devoted to a resumé of what has been accomplished by Arctic research up to the present time, and insist on the further exploration of the Arctic regions and the establishment of international stations for this purpose. The further exploration of Greenland and its coast is especially recommended.

J. T. S.

#### NORTH POLAR REGIONS. CHART OF THE ARCTIC OCEAN.

The above is the title of an excellent conical projection recently issued by the Hydrographic Office, Navy Department, Washington, D. C.

The usual meridians and parallels are omitted, there being only two meridians at right angles to each other and one longitude circle projected. The lettering of all names is placed horizontally, so that all may read from one position without turning the chart. We are pleased to see that the route which has attracted the greatest attention, namely, the Smith Sound Route, is immediately before the observer when the chart is naturally placed, and that Cape Washington is marked as the most northern land yet discovered. The converging coast-lines of Greenland indicate more clearly on this chart than on others the probable insular character of that remarkable land. The latest Arctic discoveries are clearly shown, and the chart is another creditable evidence of the progress of the Hydrographic Office.

J. W. D.

## BIBLIOGRAPHIC NOTES.

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### ANNALEN DER HYDROGRAPHIE.

PART IV., 1885. Sailing Directions for the Gilbert, Marshall and Caroline Islands.

PART V. Theory of the Lamont instrument for observations of the earth's magnetism. Surveys on the west coast of Patagonia. New passage between the Gulf of Trinidad and Gulf of Peñas, with table. Table for correcting the longitude or hour angle for a change of latitude, and other tables.

PART VI. Sailing Directions for SE. and NE. coast of New Guinea and the adjacent waters.

PART VIII. Deep sea researches in the Caribbean Sea by the U. S. Coast Survey. The Falkland Islands.

PART IX. Contribution to the cartography and hydrography of the coast of Upper Guinea between Cameroon and Accra. Sailing Directions for the Java Sea, the Celebes and the Sulu Archipelago.

### ENGINEERING NEWS AND AMERICAN CONTRACT JOURNAL.

OCTOBER 3, 1885. New ordnance material of Europe, by Captain W. H. Bixby, Corps of Engineers, U. S. A.

This periodical will publish by permission of the War Department, during the last quarter of the year 1885, a portion of an official report made by Captain Bixby upon his investigations in Europe in 1881-1882, "upon turrets, armor-plate, and the mounting and manœuvring of guns of large calibre."

The following is an abstract of the index of the report to be published :

Heavy guns ; wire-wound and ribbon guns.

Non-recoiling gun carriages ; Krupp's non-recoiling muzzle-pivoted gun-casemate gun, with detail, cost, time of manufacture, service, advantages, disadvantages and possible modifications, etc. ; Gruson's non-recoiling minimum embrasure gun-cupola gun ; Krupp's non-recoiling trunnion-pivoted gun.

Gun carriages with slight recoil ; Krupp's slight recoil trunnion-pivoted guns ; Albini carriage.

Yoke-mountings for 43-ton gun on ordinary carriage.

Front parapet anchorage.

New muzzle-pivoting mechanisms :—Shaw carriage ; Heathorn ; King ; Krupp ; Gruson (old model) ; Gruson embrasure ring ; Armstrong minimum embrasure carriage, Gruson min.-embrasure carriage.

Disappearing-gun gun carriages :—Moncrieff and King counterpoise ; Moncrieff hydro-pneumatic ; Labrousse ; Armstrong ; Razkazoff.

Under-cover loading of heavy guns :—English official system ; Armstrong system, for small guns, for 100-ton guns.

Manœuvre of heavy guns :—Bibliography of.

New forms of projectiles:—New Palliser ribbed *abd* jacketed chilled-iron projectiles; Gruson new chilled-steel projectiles.

New explosives: Gruson's new explosive of 1881; miner's powder; ammonia-nitrate powder.

Accuracy of fire of modern ordnance:—Field guns, heavy guns; rifled mortars or howitzers.

New methods of protection against moisture on wood, stone and metal surfaces:—Celluloid lining for ammunition cases; cork paint for exposed iron-work; cork composition for floors of magazines; ventilation of magazines; Cohausen's psychroscope.

*List of Plates to accompany report:*

- No. 1. Krupp gun-casemate gun of 1878.
- No. 2. Test of casemate resistance.
- No. 3. Krupp gun-casemate gun of 1877.
- No. 4. Krupp gun-casemate gun, as proposed 1879.
- No. 5. Armstrong Albini carriage.
- No. 6. Yoke mounting for 43-ton gun.
- No. 7. Gruson minimum-embrasure muzzle-pivoted movable trunnion-bed carriage; C-1880, for 6-inch gun.
- No. 8. do.; C-1880, for 11-inch gun.
- No. 9. do.; old model, for 6-inch gun.
- No. 10. Armstrong under-cover side-loading, for 7-inch barbette guns.
- No. 11. do.; in firing position.
- No. 12. do.; plan, elevation, section.
- No. 13. do.; for 100-ton barbette guns with side traverses.
- No. 14. Palliser new ribbed and jacketed chilled-iron projectiles, and target of June, 1882.

FRANKLIN INSTITUTE JOURNAL.

AUGUST, 1885. The theory of the finance of lubrication, by Professor R. H. Thurston.

SEPTEMBER. The metallurgy of steel, by Pedro G. Salom. On the jacketing of working cylinders of steam engines, by A. S. Greene, C. E.

The question of the relative merits of jacketed and unjacketed cylinders has often been discussed, but has not yet been disposed of in a satisfactory manner. In discussing the subject Mr. Greene states that since all the heat supplied to the expanding steam from the jacket must first be obtained from the original source, namely the boiler, and the jacket being also subject to a further loss of heat from radiation from the exterior surfaces, it follows necessarily that the amount of effective heat for transmission into work by the medium of the jacket is much less than that drawn from the boilers to supply it. It is in fact a sort of "robbing Peter to pay Paul" process, with this disadvantage, that the amount received by Paul is very considerably less than that of which Peter has been robbed. If it be really advantageous to reheat the expanding steam in the working cylinder, it has been suggested that a more rational and effective process be employed, in which the resistance of the cylinder shell to the transmission of heat, and the loss from radiation, from the excess of the surface of the jacket over that of the working cylinder, would be avoided. This could be easily accomplished by supplying a small jet of steam from the main steam-chest or steam-pipe directly to the interior of the working cylinder during expansion, by means of an automatically operated valve; the ports for this purpose would be small and need not be as large as the section of steam pipe used for supplying the jacket, for the same amount of heat



applied directly would certainly effect a greater amount of reheating than could possibly be done through the medium of a jacket.

Whether there is any advantage to be derived from the use of the steam jacket or not, there are several disadvantages with which it is inevitably attended. Extra labor and material are required in construction, there is liability to loss of castings from their complicated nature, besides extra weight and space occupied. In Mr. Greene's opinion the best place to utilize the heat of the steam in producing work is within the working cylinder, preventing as much as possible the losses of heat, with light sheet-iron to enclose a space corresponding to the jacket, to contain air, which enclosure should be tight enough to prevent circulation of air and loss of heat from convection, and then carefully felted and cased with wood. With a cylinder fitted in this manner it is believed better results would be obtained, and certainly many extra pipes, valves, traps, and much annoyance would be avoided.

**OCTOBER.** On tidal theory and tidal prediction, by E. A. Gieseler.

An account of the experiments made upon a condensing compound engine by a committee of the Industrial Society of Mulhouse, in Alsace, Germany; by Chief Engineer Isherwood, U. S. N.

In 1878, the Industrial Society of Mulhouse offered a medal of honor for the first compound engine built in Alsace that would give a French horse-power for not more than 9 kilogrammes of steam used per hour, equivalent to about 17.44 pounds per English horse-power. In 1879, the challenge was accepted under circumstances which Mr. Isherwood proceeds to describe.

The mean of the experiments with steam expanded 6.25 times gave the consumption of feed-water at the rate of 17.1 pounds per indicated horse-power, and with steam expanded 9.64 times with the same initial pressure, 92 pounds above the atmosphere, the weight of feed-water used was 16.93 pounds, showing no practical gain for the increased rate of expansion.

When the lower rate of expansion—6.25 times—was employed, 24.7 per cent. of steam admitted to the engine was condensed in the high pressure cylinder while the steam port was open. With the larger rate of expansion 43 per cent. was condensed when the cut-off valve closed. The re-evaporization of the water of condensation in the small cylinder under the lessening pressure due to the expanding steam, and at the expense of the heat in the metal of the cylinder and in the water of condensation, reduced the amount of condensation at the end of the stroke to 6.57 per cent. for the smaller measure of expansion, and to 11.67 per cent. of the steam admitted, for the larger measure.

At the end of the stroke of the large cylinder, the water in it due to the condensation of steam was 7.29 per cent. of the steam evaporated in the boiler for the smaller measure of expansion, and 10.5 per cent. for the larger measure of expansion. The re-evaporated steam which passed from the small cylinder to the large one during the exhaust stroke of the former was utilized upon the piston of the latter, and by fitting the large cylinder with a lap cut-off valve, this re-evaporated steam was used expansively in that cylinder.

In conclusion, Mr. Isherwood bases the economic superiority of the compound engine over the simple one worked between the same boiler and condenser pressure, with the same measure of expansion and the same reciprocating speed of piston, upon the fact that the steam condensed in the small cylinder by the interaction of its metal is used upon the piston of the large one during its whole stroke, and expansively too if a cut-off be applied there. There is, perhaps, a necessity for stating that condensation by the interaction of the metal is a totally different thing from the condensation in the cylinder of a portion of the steam to furnish the heat transmuted into the power developed by the expanding steam after the cut-off closes. In the engine experimented upon both cylinders were steam-jacketed.

## INSTITUTION OF MECHANICAL ENGINEERS, LONDON.

## APRIL, 1885. The Maxim automatic machine gun.

Much has been heard in various professional periodicals in regard to the merits of the above gun, and descriptions have also been given more or less complete. But the explanation of the system and its working by the distinguished inventor himself before the Institution of Mechanical Engineers, London, and published in the Proceedings of that Institution for April, 1885, is by far the clearest and most complete. It may be well to call attention to the fact that if at first sight it may seem to be a complicated piece of machinery, though this is by no means admitted, it must be remembered that the numerous parts are chiefly incidental to a gun using small-arm ammunition and requiring a mechanical feed. The main principle of the gun has been applied by the inventor to a larger calibre—the weight of the shot being about 3 pounds—and which when perfected will do away with a large number of parts which are necessities in the smaller gun, since a gravity feed will be used.

A gun which automatically loads and fires, leaving the operator perfectly free to aim, must suggest itself most favorably to artillerists.

The inventor's device to direct the smoke away from the muzzle of the piece or to get rid of it altogether seems most ingenious, and will be appreciated by any one who has noticed the firing of machine guns on a calm day or when firing against or with the wind.

## JOURNAL DU MATELOT.

## No. 27, 1885. The Condor.

This torpedo cruiser, launched at Rochefort last May, was designed by M. Bussy, and may be said to have no counterpart in foreign navies. She is a twin-screw steel vessel, at the same time a torpedo scout of great speed and a counter torpedo boat, armed solely with fish torpedoes and guns of small calibre, 216½ feet long, 29 feet beam, 12 feet 5 inches draught forward and 15 feet 5 inches aft, displacement 1272 tons. A compound engine drives each screw, and with forced draft the speed is expected to exceed 17 knots. The hull is divided into ten water-tight compartments by thwartship bulkheads reaching to the armored deck, while fore and aft bulkheads add to the strength. A steel turtle-back protective deck extends the length of the vessel. There are no masts except for signals and revolving cannons. The armament consists of five torpedo tubes, two forward, one astern, and one on each broadside, 5 steel 10 cm. guns and 6 Hotchkiss revolving cannons.

## The Acheron.

A twin-screw steel armored gunboat; was launched at Cherbourg in April last. She is 181 feet long, 40 feet 4 inches beam, with a displacement of 1640 tons. The water line is protected by an armor belt; the armament will be a 27 cm. gun in barbette tower and two 10 cm. guns.

## MITTHEILUNGEN A. D. GEBIETE D. SEEWESENS.

VOL. XIII., Nos. 3 & 4. Measurement of the fuel used by marine engines at different rates of speed. Recent additions to foreign fleets.

An interesting resumé of the armored and other vessels projected and completed for the navies of the various maritime powers.

Nos. 5 & 6. Side and deck armor. Improvements in distilling apparatus, the Perrog system. Rain clothes for the crew. Electric boats.

No. 7. Innovation in the preparation of gunpowder. Compound engines of the Italian cruiser Etna. The English Navy. The German Navy.

No. 8. The problem of determining the deviation of a steamer's compasses at sea. Chronograph of the present time. Approximate construction of the stability curve by the use of paper patterns.

### The Japanese Navy.

A description of three new cruisers and a sea-going torpedo boat.

## NAVAL AND MILITARY GAZETTE.

AUGUST 26, 1885.

The Chilian ironclad Blanco Encalada was docked recently for the first time since she left England ten years ago. The iron bottom had then been covered with teak plank with iron fastenings, and sheathed with zinc. Notwithstanding the ten years' immersion, the bottom was found to be remarkably clean, and the waste of zinc scarcely as much as had been anticipated.

## NAUTICAL MAGAZINE.

JULY, 1885. The Maritime Inventions Exhibition ; the curszierger.

An instrument devised by Captain Martinolich, of the Austro-Hungarian Lloyd Steamship Company, to take the place of parallel rulers and chart compass cards in determining course and distance on sea charts. It consists of a rectangular ruler 45 cm. long and 6.8 cm. broad, to which is pivoted at one end another ruler of about the same length ; on both are scales of equal parts. At the pivot end are two superposed concentric compass cards of different diameters. The ruler is placed on the nearest meridian, and the movable arm is brought over the points between which course and distance are required. The device is ingenious and useful, but will not take the place of parallel rulers, especially those of the Sigsbee type. The diastimeter is another device of the same inventor. It is a diagram by which problems in coast navigation may be solved practically.

Improved method of attaching rope stoppers to ships' decks.

By this invention the stopper takes the direct pull of a rope in any direction.

OCTOBER. Lighthouse illuminants (report of the Trinity House Committee).

"That for ordinary necessities of lighthouse illumination mineral oil is the most suitable and economical illuminant ; and that for salient headlands, important landfalls, and places where a powerful light is required, electricity offers the best advantages."

The action of electricity upon ship's compasses.

In this communication Commander Chas. S. Hudson sounds a note of warning in regard to connecting one wire of a dynamo with the ship's frame for the return current, claiming that the magnetic conditions of the hull are changed, and that the compasses are affected thereby. An extract from *The Marine Engineer* for August, 1881, is given : "A steamer has just arrived in London from the Clyde steered by electricity ; it was most successful, but the compasses were so affected by electricity as to be practically useless."

## REVUE MARITIME.

JULY, 1885. Naval battles in the middle of the 17th century. The late Admiral Courbet. The French armored cruiser Requin.

Launched at Bordeaux June 13; length, 271 feet; beam, 59 feet; draught, 23 feet; displacement, 7210 tons; thickness of armor, 19.7 inches. She has twin screws, and is calculated to make 14.5 knots and to develop 6000 horse-power. The hull is of steel, double bottom, and she is to carry two steel 15½-in. guns in turrets.

## The Japanese cruiser Takachiko-kan.

This vessel, similar to the Naniwa-kan, was launched May 16; length, 229½ feet; beam, 34 feet; draught, 16 feet 2½ inches; displacement, 3600 tons. The calculated horse-power is 7500, and the speed expected from 18 to 18½ knots; the two engine and fire-rooms are completely separated. She will carry two 10-in. guns on central pivots, six 6-in. guns in broadside, ten machine and two rapid-firing guns, and four torpedo tubes.

## AUGUST. Trial of the Brazilian armor-clad Aquidaban.

At full speed, natural draft, the speed was 15.257 knots; forced draft, 15.818 knots; with one screw, 11.447 knots. In the latter case it was found necessary to keep the rudder at an angle of 15°. A coal consumption of 15 tons a day gave a speed of 14 knots, enabling her to steam a little more than 17 days.

SEPTEMBER. The canal from the North to the Baltic Sea. Naval construction and men-of-war. The Francesco Morosini.

This Italian steel armor-clad was launched at Venice July 30. Length, 328 feet; beam, 54 feet 9 inches; draught, 25 feet; displacement, 10,045 tons. She has twin screws and a coal capacity of 850 tons, and is expected to develop 10,000 horse-power and 16 knots speed. The armor, manufactured by the Creusot process, varies from 17.7 inches to 14.2 inches in thickness. The armament is four 106-ton guns, two 6-in. guns, machine guns and five torpedo tubes.

OCTOBER. Observations on the relative speed of wind and ship, taken aboard the Jean Bart. Optical telegraphy. Spanish 15-cm. gun.

This is of cast iron, reinforced by a double steel tube extending 50 cm. beyond the trunnions. The length is 30½ calibres; the weight, cast iron 12,225 lbs., tubes 2676 lbs. During the trials projectiles were used of 3½ calibres length, with one expanding ring. Several plates representing a total armor thickness of 10.2 inches were penetrated. The initial velocity was 2165 feet; the range at 19° elevation, 8750 yards. This gun was manufactured at Trubia, Spain, and was invented by Don Salvador Diaz Ordenez, of the Spanish Artillery.

## REVUE SCIENTIFIQUE.

JULY, 1885. Naval art; collisions at sea, means to prevent them at night.

Principally calling attention to the defects of the present system of ship's side-lights, and suggesting that an international conference assent to and regulate the routes of ships, and especially determine certain rules for those steamers of more than 15 knots speed. There are three remedies between which to make choice, likely to lessen the chances of collision:

1. Routes determined beforehand, and outside of which no vessel in a fog is to steam more than 14 knots. 2. Or a greater number of lights for high-speed steamers. 3. Or better: stronger, more powerful lights, electric lights if necessary, which can be *immediately* replaced if injured.

The conference should examine all the different methods proposed to give as nearly automatically as possible, the proper manœuvre to perform in each case. After proper examination and discussion let the conference choose one, or make one from the combination of the better portions of each system. The important point is to recommend the adoption of a uniform system.

Three officers have called attention to this important question—in these days of rapid steam navigation nothing concerning safety at sea is more important—Captain C. E. Buckle, R. N., and Lieutenant Alfred Collet, F. N., principally in regard to better rules and more definite routes, suggested by the great improvements in compasses and sounding machines; and Commander Hoff, U. S. N., advocating the employment of double lights.

#### RIVISTA DI ARTIGLIERIA É GENIO.

AUGUST-SEPTEMBER, 1885. The effect of bombardment on the matériel and on the personnel.

An interesting resumé of bombardments since 1684. The writer arrives at the conclusion that in general, resistance is possible in bombardments of greater or less severity whether sustained in works, intrenchments, or forts, as well as in heavier bombardments, or those against cities partially or entirely exposed to the destructive effects.

Translation of Vol. X., No. 4, of Proc. Nav. Inst., pp. 570 to 593.

#### RIVISTA MARITTIMA.

JUNE, 1885. The Italian merchant marine.

On December 31, 1884, there were 7072 sailing vessels with a tonnage of 848,704, and 215 steamers with a tonnage of 122,297.

The Italian Navy estimates.

JULY-AUGUST. Electric lighting on board the Giovanni Bausan.

#### ROYAL ARTILLERY INSTITUTION, PROCEEDINGS.

SEPTEMBER, 1885. The attack of armor by artillery, by C. Orde Brown, late Captain R. A.

"For the sake of distinction, armor may be divided into two classes, *soft* and *hard*. Under the head of *soft* armor may be included all shields which admit of *perforation*, which, when possible, is the best method of attack. *Soft* armor then includes all kinds, consisting of wrought-iron only, whether laminated, plate-upon-plate, or solid. Occasionally a steel or steel-faced plate has had a hole made completely through it without breaking it up, but this is not generally possible. Wrought-iron was universally employed until chilled iron armor was adopted for certain land forts on the Continent. This was first tried in 1868 with success, and in 1873 it met with very marked approval. After the Spezia trials of December, 1876, steel and steel-faced armor came gradually into use. Up to that time our experiments in England were almost entirely confined to the problem of the perforation of wrought-iron; and even now perforation is kept in view with steel-faced plates in a measure, for a shot is generally considered to be a match for a steel-faced plate when it is capable of *perforating* some estimated equivalent thickness of wrought-iron. Suppose, however, that such a relation can be established, its application is limited to



the few cases when perforation without much fracture is effected, and may greatly mislead any one who uses it indiscriminately, for the following reason: Power of perforation varies inversely with the diameter of the hole made. Thus a shot of less energy than another may perforate the same thickness of armor if its calibre is less, because it does not require to make so large a hole. Thus the 9.45-inch Krupp gun in 1879 had about the same power of perforation as the 12.5 Woolwich gun, namely, about 18 inches, and would be considered a match for the same plate."

"If, however, armor is too hard to perforate, and yields by breaking up instead, it appears doubtful if the smaller calibre possesses any advantage over the other. The work of 'smashing' appears to be more likely proportional to the striking energy or stored-up work. Thus, in the case above quoted, the 12.5-inch shot has more energy than the 9.45-inch shot, in the proportion of nearly 3 to 2, and might break up armor accordingly. So, again, the 100-ton M. L. gun at 2200 yards had about the same perforation as the 43-ton B. L. gun at the muzzle, namely, about 24 inches of iron. Its energy, however, is greater in the proportion of 3 to 2; and the larger projectile has this advantage with a velocity of only 1500 feet per second, while that of the smaller one is over 2000 feet. It is quite conceivable then that the former would hold better together, and thus deliver perhaps double the blow of the smaller one before breaking up. In such a case, then, it appears that the standard of perforation is a very erroneous one.

"It is, however, the only standard which has been definitely worked out, and on it our diagrams and rules are based. They must therefore be considered correct only when applied to cases of *soft* armor. *Hard* armor, which cannot be perforated, includes chilled cast-iron, and, in most cases, steel-faced armor and steel, though the latter may be made so soft as to approach wrought-iron, and so be perforated in a fairly clean hole. This, however, has not been the character of most of the steel plates hitherto tried. A projectile may drive its point a short distance into *hard* steel, but eventually it acts as a conical wedge, splitting up the plate, and the shot breaks up before the entire head enters the plate, so that the size of the calibre probably affects the problem less than the shape of the point, and it appears that the main question is that of striking energy, modified by the shot's power to hold together, which again depends directly on tenacity of metal, and possibly inversely on some function of the striking velocity."

Under the head of "Perforation of Soft Armor" is given an interesting discussion and comparison of the various empirical formulas which have been suggested and used, including those of Fairbairn, Inglis, Maitland, Noble and Krupp, and the author also gives an interesting table showing the measure of accuracy of the results given by the Rule of Thumb, which is that the thickness of iron that may be perforated by a shot is found by multiplying the calibre by the number of thousand feet striking velocity, with those given by Maitland's diagram—using the various guns in the English and German services; and the conclusion reached is that under circumstances when a quick estimate of the power of the gun is necessary, the above rule will hold good without a large error.

Under the heading "Hard Armor" the author remarks:

"In compound or steel-faced armor, actual perforation has occasionally been obtained; occasionally also a steel shot has set up and driven a large disk out of a compound plate, which action may partake of the character of perforation, and its diameter may bear some relation to that of the projectile. Most compound and solid steel shields, however, and all chilled iron shields must be destroyed by fracture, the shot's point penetrating only to a certain depth, often an insignificant one."

"Here, then, fracture is caused by a blow delivered, as it were, on an ogival-pointed wedge, which splits the shield asunder. This action differs widely from perforation; for while in both cases the stored-up work or energy



is the motive power, in *perforation* the thickness perforated depends inversely on the size of the hole of diameter of the shot. Whereas in destruction by fracture the point only of the shot enters the plate, and its diameter can scarcely enter into the question. . . .

"The question of fracture is a difficult one. It has been said to be altogether beyond mathematical calculation. It must, however, follow certain laws if uniformity of quality could be secured, for even steel is not really capricious. The elements certainly are troublesome ones. As to dimensions, the minimum cross-measurement is the line of most probable fracture, but bolt holes and other features have their influence. Cracking, itself, is a complicated action. Clearly the first half of a crack represents much more work than the completion of it, consequently an increase in width of plate would not probably give a plate a proportional increase in resisting power. It is suggested that the subject might be approached on a small scale, that steel bullets might be fired against small slabs of steel and chilled iron. These slabs should be sufficiently long to ensure a line of least resistance in one direction, which would probably depend on its actual dimension; a disk or any plate where the direction of the line of least resistance might probably be determined by a flaw would be the worst kind to employ."

"By firing at very great numbers of small plates with all the conditions fixed, except the one at the moment under investigation, it is probable that something might be learned of the laws of fracture under impact. In the meantime little can be said definitely about it beyond the elementary but important fact that effect is not proportional to the shot's perforation, but much more nearly to its total energy, a consideration that may actually affect the selection of the guns employed against hard shields on service; if, however, armor should in the long run be made hard enough to resist perforation proper, that is, perforation without breaking up the armor, it follows that the destructive powers of guns will depend not upon their power of perforation, but upon the stored-up work or energy. The value of a gun may generally, therefore, be estimated on the measure used by Krupp, that is, the energy per ton of gun. New type guns will not then benefit by the fact that the reduced diameter of the projectile demands a smaller hole in the plate. For example, the new 63-ton gun of 13.5-inch calibre of 1884 has a velocity of 2050 feet and a perforation at the muzzle of about 30 inches of iron. This will seldom apply, for it will seldom have to fire at anything approaching 30 inches of iron; the nearest approach perhaps may be found in very soft steel. The projectile has, however, a total energy at the muzzle of about 36,350 foot-tons. This will represent its total smashing power against hard armor. This is about 577 foot-tons per ton of gun, which represents the value of the gun as an investment in artillery power. If this be compared with the energy per ton of the 38-ton gun, which was 360 foot-tons, the extent of the artillery improvements in the construction of guns and burning of powder will be appreciated."

#### ROYAL UNITED SERVICE INSTITUTION JOURNAL.

No. CXXVII. Machine guns in the field, by Captain Lord Charles Beresford, R. N.

Lord Beresford says, as a naval officer he feels a certain amount of hesitation in taking up a question which perhaps the officers of the Army might naturally think peculiarly their own; at the same time it must be remembered that the Navy has had more actual experience in working machine guns in the field than any other branch of Her Majesty's service; and guns for this purpose are supplied to the naval service, but not to the Army. He describes a machine gun proper as a gun without recoil; in other words, a gun which does not require relaying after every shot; and there are two entirely distinct kinds of such guns, the one a shell-firing gun, and the other a bullet-firing or rifle-calibre gun. International law does not admit any explosive projectile under

14 ounces in weight, which would mean  $1\frac{1}{4}$  in. diameter, and the weight of a machine gun throwing such a projectile would detract from its value as a machine gun, making it almost artillery. It is still undecided whether these guns are for the infantry, artillery or cavalry. Fifteen years ago the Germans said the artillery don't want it and the infantry won't have it. This still finds favor with many. The value of the gun as a means of attack is still uncertain, but its great superiority as a means of defence is unquestioned. It is estimated that a first-class gun is equal to 70 men with rifles in repelling an attack, so far as the number of shots delivered; and infinitely superior in accuracy, because the piece has no nerves and cannot get excited. The questions of manning and mounting the piece as well as providing ammunition were discussed. The gun's crew must be regulated by the service intended; to work the piece requires a very few men, but to transport it and its ammunition, if no animals are used, will require a great many. The small gun when mounted on a tripod can be carried by two men.

The result of the discussion would seem to be that the guns will not take the place of artillery, but be rather an infantry arm. That the guns should be mounted on a tripod or on a carriage without limber, so that the gun may have an all-around fire over the wheels. The carriage should be fitted with shafts, that a horse may drag it when on distant service. The ammunition to be of same calibre used in the rifles of the command, and so much of it as is not carried on the carriage should be carried on pack mules or horses. (The question of supply of machine gun ammunition is one of vital importance, *vide* Nav. Inst. Proceedings, 7, 416.)

No. CXXX. Electricity as applied to naval purposes, by Lieutenant W. A. Chisholm-Batten, R. N.

This article gives a resumé of the subject in a general way without going much into particulars. It divides the subject into two general parts: 1st. Application for general purposes; 2d. Application for war purposes. Under the former it discusses electric lighting, external and internal, the use of the telephone and of the telegraph both on board and by landing parties, electric speed and distance indicators, and the use of electricity for the propulsion and steering of boats. Under the latter head it considers the firing of guns by electricity, which it places as first in importance, and the use of electricity in firing, propelling, and steering torpedoes, in firing mines, and in detecting torpedoes. The subject is one of great interest to naval officers, and Lieutenant Batten's article is well worth reading.

#### UNITED SERVICE GAZETTE.

JUNE 27, 1885. The speed trials of the steel dispatch vessel *Surprise*.

These have been completed, with the following results: With forced draft, speed, 17.846 knots an hour; revolutions, 133 a minute; collective H. P., 3107.7; fuel consumption, 2.78 pounds per H. P. an hour; steam pressure, 96.6 pounds per square inch. With natural draft; speed, 16.49 knots; H. P., 2104; fuel consumption, 2.6 pounds. Each engine has cylinders 26 inches and 50 inches in diameter with a stroke of 34 inches; steam is supplied from 4 boilers at 100 pounds pressure. With the helm hard over the ship turned in a circle of 244 yards diameter in 3 minutes. An arched steel deck  $\frac{3}{8}$  inch thick runs the entire length of the ship, and the engines and 8 boilers are further protected by side coal bunkers 114 feet long and 7 feet wide. The vessel is 250 feet long, with  $30\frac{1}{2}$  feet beam, 1400 tons displacement, mean draught 13 feet, and has 48 water-tight compartments. The complement will be 86 officers and men, and she will carry 400 tons of coal.

#### JULY 4. The evolutionary squadron in Bantry Bay.

"One result of the experiments, as far as they have gone, cannot but be to diminish the confidence which has hitherto been felt in the mosquito (torpedo) fleet as an auxiliary to the ironclads of the squadron. For harbor defences they are no doubt excellent; but it must be taken as proved that they are not sufficiently seaworthy to be relied upon to accompany a fleet in all weathers." The ease with which the Polyphemus snapped the boom for the protection of the defending vessels, though strengthened by two 5-inch steel cables, was remarkable; and after such a display of power, it can be said that no fleet can consider itself protected by a boom against the attack of an enemy possessing a vessel of that type.

#### Explosion on board H. M. S. Valiant.

While engaged in practice with "hand charges" containing about one pound of gun-cotton, the operator threw the charge from the stern of the launch towards the water, but in some way the connecting wire became entangled. While endeavoring to clear it, the pistol in the other hand of the operator went off and fired the charge. The entire stern of the launch was blown out, pieces of metal were buried in the bulwarks and thwarts, and a hole pierced in the side. Though none of the crew of eight men was killed, several were dangerously wounded.

#### JULY 11.

The removal of the plates from the Leander, which ran on Hornet Rock in Bantry Bay, showed that about 50 feet of the ribs and divisional plates of the double bottom were crushed into all shapes. The first longitudinal frame was twisted and bent in every direction, and a number of the ribs were literally doubled up. There was not a crack or fissure to be seen in the plates, which were made of the best homogeneous steel. The plates that were taken off were passed through rollers and straightened, and some of them have been put back into their places in the ship. This illustrates the superiority of homogeneous steel over iron for ship construction. Another lesson taught is, that with double bottoms, the inner bottom should be as strong, if not stronger, than the outer.

Mr. Nordenfelt has applied for a patent for incorporating gunpowder as follows: Sulphur is put in solution as sulphate of carbon; this is mixed with carbonaceous matter, cotton or cellulose fibre ground to an impalpable powder. Finally a saturated solution of saltpetre is added, all in required proportions. By evaporation an almost liquid gunpowder is obtained.

#### JULY 18.

Two steel-gun torpedo boats, building at Devonport, will when completed be powerfully armed craft. The boilers and engines are to be placed on board before the vessels are launched, so that steam may be got up and the engines worked the day after they are launched. The vessels are 195 feet long, 28 feet beam, have a displacement of 435 tons and a mean draught of  $10\frac{1}{2}$  feet. They will carry 250 tons of coal, will develop 1200 I.H.P., and will be armed with one 6-inch and three 5-inch B. L. R., with Nordenfelts and Gardners, and will cost about \$203,000 each.

#### JULY 25. The Icarus.

This sloop of the Racer class, which proved very successful in the late manœuvres at Bantry Bay, is to be launched shortly. She is 167 feet long, 32 feet beam, with a displacement of 950 tons and an extreme draught of 14 feet 4 inches. The coal supply is 150 tons, and the speed with ordinary draft,

I. H. P. 1200, is to be  $12\frac{1}{2}$  knots, with forced draft 14 knots. She will carry a crew of 100 men and eight 5-inch B. L. R., four in central pivot on poop and forecastle, besides four Nordenfelts and Gardners. She has been barely a year building and will cost about \$237,000.

### The Lorenz bullet.

The experiments made in Germany with these balls, formed of a very thin shell of steel filled with lead, show that while there is no erosive action upon the barrel of the gun, the penetration is four times that of the ordinary lead bullet. Tungsten has been suggested as a substitute for lead in the manufacture of bullets, on account of its greater specific gravity, the ratio being as 17.6 to 11.4.

### AUGUST 15. The Amphion.

This twin-screw steel cruiser will shortly be completed, and from improvements made in her armament and from her increased speed she will be much superior to her sister ships, the Mercury and Leander. She is built entirely of steel, is 300 feet long and 46 feet beam, with a displacement of 3750 tons. On her trial 6000 H. P. was developed and a speed of 18 knots. The armament consists of ten 6-inch guns on Vavasseur carriages, six in broadside and four on raised platforms on central pivots; eight Nordenfelts, four Gardners, and ten 14-inch Whitehead torpedoes. She is fitted with electric lights, has a coal capacity of 1000 tons, and her complement is 257 men. The total cost of hull and machinery is about \$850,000.

### AUGUST 29. The Nordenfelt submarine boat.

This Winans-cigar-shaped boat is built of plates of mild steel  $\frac{5}{8}$  inch to  $\frac{3}{4}$  inch thick. The sponsons on each side form wells for the protection of two propellers which act in a vertical direction for submerging the boat; in case of accident to the machinery, the boat being buoyant will rise. Balanced rudders are used to maintain a horizontal position, and when the boat is submerged steam is supplied by means of the heat which has been accumulated in a water reservoir while at the surface, where the steam motive power is derived from an ordinary marine boiler. Mechanical appliances cool the air, and show its life-sustaining properties; indicate the depth, and stop the vertical propellers when a desired depth has been reached, and start them again as soon as the boat rises from it; pump out in case of leakage, and lighten in case of emergency, by blowing out eight tons of hot water. There is sufficient air space for four men to be entirely cut off from communication with the outer air for six hours, though the longest time that the boat has remained totally submerged is an hour. The boat has made a trip of 600 miles on the surface, having gone 150 miles without recoaling; completely closed up, it has been driven 16 miles by the heat from the hot water reservoir, the speed being 3 miles per hour. Though the boat is intended to withstand the pressure at a depth of 100 feet, the greatest depth at which it has been worked is 16 feet. As a means of defence against surface boats it is intended to carry a  $1\frac{1}{2}$ -inch single barrel Nordenfelt shell gun.

### SEPTEMBER 12. Coast and harbor defences.

Messrs. Seath & Co., of Glasgow, have submitted a plan of a vessel for harbor defence, to be 150 feet long with 30 feet beam, divided by three fore and aft and eight thwartship bulkheads into thirty-two water-tight compartments. The bottom part of the shell describes a segment of a circle from stem to stern to allow the vessel to turn upon her own axis. Above the water line is a steel belt two inches in thickness, tapering upwards and downwards to deflect projectiles. The armament is to consist of two heavy immovable guns, one forward and one aft, to be trained by the helm.

## SEPTEMBER 19. The Benbow.\*

This vessel will draw 26 feet 3 inches forward, and 27 feet 3 inches aft ; the coal capacity is 1200 tons, and estimated speed 16 knots. The thickness of the armor plating is, on the sides 18 inches, bulkheads 16 inches, barbettes 14 inches and 12 inches, conning tower 12 inches and 9 inches, armor tubes 12 inches, screw bulkheads 6 inches, decks, 3 inches and  $2\frac{1}{2}$  inches ; skin plating, 1 inch ; the wood backing, of teak, 15 to 12 inches. The cost of hull and fittings is \$2,300,000, of machinery, \$518,000 ; complement of men, 455.

The despatch vessel Mercury will be armed with thirteen 5-inch B. L. R., ten broadside, two forward, and one on the poop.

## SEPTEMBER 26. The Gatling gun accident.

While the vessels of the Channel squadron were engaged in exercising with machine guns, an explosion took place on board the Sultan, in the hopper of a Gatling, by which two men were badly hurt. [No details are given, but the gun and hopper were sent to the Admiralty, where the cause of the explosion will be investigated.]

\* Proc. Nav. Inst., XI. 631.















